Strata® CTX

Digital Business Telephone Systems

CTX100 and CTX670 Installation and Maintenance Manual

September 2002

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Introduction

This manual provides detailed step-by-step instructions for installing and maintaining the Strata CTX100 and CTX670 digital business telephone systems. It is intended for qualified service technicians and system programmers.

Use this manual in conjunction with the *Strata CTX Programming Manual* which covers the programs related to the Strata CTX100 and CTX670 systems discussed in this book.

Organisation

This manual is organised into these sections/chapters for your convenience:

- **Chapter 1 – Strata CTX Configuration** explains how to configure a Strata CTX100 or CTX670 system. It also provides worksheets for determining hardware and station equipment placement and requirements.
- **Chapter 2 – Strata CTX100 Installation** covers site requirements and Base and Expansion cabinet installation for the CTX100. Also includes input power requirements, cable lengths/ network requirements, and grounding requirements.
- **Chapter 3 – Strata CTX670 Installation** covers site requirements and Base and Expansion cabinet installation for the Strata CTX670. Explains how to remove and replace cabinets on installed systems. Also includes input power requirements, cable lengths/network requirements, and grounding requirements.
- **Chapter 4 – PCB Installation** provides procedures for Strata CTX system Printed Circuit Boards (PCBs) for installation into universal slots. Includes installation instructions, optional configuration information, and wiring and programming considerations for each PCB.
- **Chapter 5 – ISDN Interfaces** contains an overview of the ISDN hardware with specific information on the ISDN Primary Rate Interface (PRI) and Basic Rate Interfaces (BRI). It includes instructions for installation, hardware requirements, wiring requirements, and some programming considerations.
- **Chapter 6 – MDF PCB Wiring** contains point-to-point wiring diagrams for connection of telephones, lines, peripheral equipment, and power supplies to the Strata CTX systems.
- **Chapter 7 – Station Apparatus** provides instructions on how to connect telephones to the Strata CTX systems and how to configure and upgrade them for optional features. Procedures for installing direct station selection consoles, PC and conventional attendant consoles, and door phones also appear.

- **Chapter 8 – Peripheral Installation** provides connection procedures for optional peripheral equipment to Strata CTX systems. The instructions include hardware requirements, PCB configuration, interconnection/wiring requirements, and programming considerations.
- **Notes to Users**
- **Index**

Conventions

Conventions	Description
Note	Elaborates specific items or references other information. Within some tables, general notes apply to the entire table and numbered notes apply to specific items.
Important!	*Calls attention to important instructions or information.*
CAUTION!	Advises you that hardware, software applications, or data could be damaged if the instructions are not followed closely.
WARNING!	Alerts you when the given task could cause personal injury or death.
[DN]	Represents any Directory Number button, also known as an extension or intercom number.
[PDN]	Represents any Primary Directory Number button (the extension number for the telephone).
[SDN]	Represents any Secondary appearance of a PDN. A PDN which appears on another telephone is considered an SDN.
[PhDN]	Represents any Phantom Directory Number button (an additional DN).
Arial Bold	Represents telephone buttons.
Courier	Shows a computer keyboard entry or screen display.
"Type"	Indicates entry of a string of text.
"Press"	Indicates entry of a single key. For example: Type **prog** then press **Enter**.
Plus (+)	Shows a multiple PC keyboard or phone button entry. Entries without spaces between them show a simultaneous entry. Example: **Esc**+**Enter**. Entries with spaces between them show a sequential entry. Example: **#** + **5**.
Tilde (~)	Means "through." Example: 350 ~ 640 Hz frequency range.
➤	Denotes the step in a one-step procedure.
➤	Denotes a procedure.

Conventions	Description
Start > Settings > Printers	Denotes a progression of buttons and/or menu options on the screen you should select.
See Figure 10	Grey words within the printed text denote cross-references. In the electronic version of this document (Library CD-ROM or FYI Internet download), cross-references appear in blue hypertext.

Related Documents/Media

Note Some documents listed here may appear in different versions on the CD-ROM or in print. To find the most current version, check the version/date in the Publication Information on the back of the document's title page.

General Description

- Strata CTX General Description

Installation and Programming

- Strata CTX Programming Manual

User Guides

- Strata CTX DKT3000/2000-series Digital Telephone
- Strata CTX DKT3001/2001 Digital Single Line Telephone
- Strata CTX Standard Telephone
- Strata CTX DKT2004-CT Cordless Telephone (*For use in the US Only*)
- Strata CTX DKT2104-CT Cordless Telephone (*For use in the US Only*)

Quick Reference Guides

- Strata CTX DKT3000/2000-series Digital Telephone

CD-ROMs

- Strata CTX WinAdmin Application Software and Documentation Library
- Strata CTX Quote

For *authorised users,* Internet site FYI (http://www.toshiba-telecoms.co.uk) contains all current Strata CTX documentation and enables you to view, print and download current publications.

Strata CTX Configuration 1

This chapter contains information and worksheets to help configure the Strata CTX100 and CTX670 hardware components. A system overview of both the Strata CTX100 and Strata CTX670 hardware components and the maximum station and line capacities available with the system processor is provided.

Worksheets follow this information to aid in determining the actual cabinets and interface PCBs needed for particular proposals and how these PCBs should be placed in Strata CTX cabinet slots.

Note The Strata CTX100 and CTX670 system capacities depend on the licenses stored on the system processor, as well as the hardware mentioned above.

Strata CTX100 Overview

The Strata CTX100 system is a compact system that provides large system features (see Figure 1-1). It is designed for wall mounting and occupies very little space.

The CTX100 basic processor can be configured with a one or two cabinet system. A single (Base) cabinet system supports a combination of up to 64 Exchange lines and stations, while a two (Base and Expansion) cabinet system can support up to 112 Exchange lines and stations.

System line and station capacity is expanded by adding Exchange line and station Printed Circuit Boards (PCBs) into its universal slot architecture.

The CTX100 easily connects to outside public and private telephone lines. All of the telephones (stations) tied to the system can have direct access to each other, as well as to the public and private network.

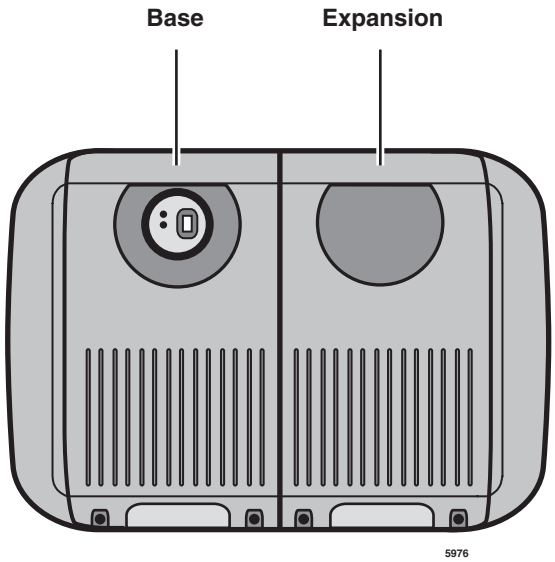


Figure 1-1 CTX100 Base/Expansion Cabinets

Each CTX100 system has a Base Cabinet with one optional Expansion Cabinet. All lines, stations, and options are tied together through the cabinets. The overall weight and dimensions of the CTX100 cabinets are shown in Table 1-1.

Table 1-1 CTX100 Cabinet Specifications

Cabinet	Weight[1]	Height	Width	Depth
Base Cabinet (CHSUB112F)	10.8kg (19.4lbs)	37.1cm (14.6in)	30.2cm (11.9in)	25.9cm (10.2in)
Base + Expansion Cabinet (CHSUE112F)	18.87kg (34.6lbs)	37.1cm (14.6in)	50.6cm (19.9in)	25.9cm (10.2in)

1. Weight includes the processor PCB in the Base Cabinet and four universal PCBs in each cabinet.

CTX100 Processor

The system operates with one processor circuit board (ACTU) that installs in a dedicated slot of the Base Cabinet. The ACTU processor incorporates the following on-board hardware features:

CPU/Memory

The CTX100 uses a high-speed, 32-bit, RISC processor, Dynamic Random Access Memory (DRAM) working memory, Static Random Access Memory (SRAM) with lithium battery for memory back-up, and flash program memory.

Large Scale Integrated (LSI) Circuits

Custom Toshiba LSI circuits provide on-board conference switching circuits for up to eight-party conferences and digital Pad circuits to adjust audio volume levels in eight steps to compensate for conference and/or network losses.

Memory Protection Battery

If commercial AC power is lost or if a system is moved or stored without power, the processor has an on-board battery that protects data and the customer's programmed configuration from memory loss. This information will be maintained in a powerless system for at least six years.

Relay Control Interface

An on-board terminal strip provides an interface to a normally open relay contact which can be programmed to control a Night Bell, door lock or to mute BGM during an external page.

Music-on-hold/Background Music Interface

Two RCA jacks and volume controls are built into the processor to interface with Music-on-hold and/or Background Music (BGM) sources (one of the jacks is for future use). With the CTX100, you can have up to 15 MOH/BGM source interfaces by adding:

- *Up to two BIOU PCBs, each provides three MOH/BGM input sources*
- *An RSTU PCB that provides up to eight MOH/BGM input sources*

SmartMedia Memory

The processor has an on-board SmartMedia™ memory card slot. A SmartMedia flash memory card can be inserted into the slot to backup and restore customer program data. It also makes it easy to upload operating system data for software upgrades and is used for maintenance functions.

CTX100 Processor Optional Subassemblies

Optional subassemblies can be attached to the ACTU processor to provide additional features. The subassemblies are:

- **AMDS (Modem)** – *Provides a 33.6Kbps/V.34 modem for point-to-point local or remote connection to the CTX WinAdmin™ administration PC.*
- **ARCS (DTMF Receiver/Busy Tone Detector)** – *Provides 16 DTMF receivers maximum and 16 Auto Busy Redial (ABR) Busy Tone detectors maximum.*
- **AETS (Ethernet LAN Interface)** – *Provides one 10baseT Ethernet circuit with an RJ45 connector for CTI Open Architecture applications, CTX Attendant Console, ACD Server, Toshiba Proprietary Voice Mail integration and system administration connection (including local and remote CTX WinAdmin).*
- **BSIS (Serial Port Interface)** – *Provides up to two RS-232 interface ports for SMDR interface to Call Accounting devices, SMDI or Toshiba Proprietary interface to Voice Mail devices, and two future applications.*

CTX100 Cabinet Slots

Base Cabinet

The Base Cabinet has one dedicated slot used for the system processor PCB and four universal slots (S101~S104), that can accommodate station, line or option PCBs. It also houses a power supply that is packaged with the cabinet.

An optional ASTU unit can be fitted to the side of the LHS of the base cabinet. A small ribbon cable connects the ASTU unit with the CTX100 processor board. This unit provides two standard Single Line Telephone ports without using normal system slots. The CTX100 software sees the ASTU unit as occupying Slot 109.

Expansion Cabinets

One expansion cabinet provides four universal PCB slots (S105~S108) that can accommodate station, line or option PCBs. It also houses a power supply that is packaged with the cabinet.

CTX100 License Control

The system size and feature capability is controlled using a software License Key Code. This key code is obtained from (http://www.toshiba-telecoms.co.uk/dealer) during the ordering process and is installed onto the system processor via Strata CTX WinAdmin. Processor license codes activate system hardware capacities in the following increments.

- *The first 32 line/station ports do not require a license. Each additional set of four line/station ports requires one CTX100 PORT LIC license (maximum of 112 ports).*
- *The optional DTMF receiver circuit (ARCS) provides 16 DTMF receiver hardware circuits and 16 ABR circuits. The first four DTMF circuits and all ABR circuits do not require a license. Each additional set of four DTMF receiver circuits requires one CTX100 DTMF LIC license (maximum of 16 DTMF circuits).*

Note DTMF tone receiver circuits are required for standard telephones, Voice Mail DTMF integration, Tie, DDI and DNIS line service.

- *The optional RS-232 serial port interface (BSIS) provides two circuits to interface with SMDI or Toshiba Proprietary Voice Mail integration, Call Accounting SMDR, and two for future applications. The first circuit does not require a license, but circuits two through four each require one CTX100 SERL LIC license.*

The list below outlines all the licenses that can be purchased for CTX100 and their associated capacities.

- CTX100 PORT LIC- Purchase of ONE license will increase system ports by 4. Max 112
- CTX100 DTMF LIC- Purchase of ONE license will increase DTMF receivers by 4. Max 32
- CTX100 CSTA LIC- Purchase of ONE license will increase CSTA sessions by 1. Max 9
- CTX100 QSIG LIC- Purchase of ONE license will enable QSig on the switch.
- CTX100 WOC LIC- Purchase of ONE license will allow 1 WOC to be supported. Max 4
- CTX100 SERL LIC- Purchase of ONE license will allow 1 serial port to be supported. Max 4 but only two have a use at present.

Licensed Software Options

Some software options are activated with license codes. The following software options require a license:

- *Each CTX system (node) in a Strata Net QSIG Network requires one CTX100 QSIG LIC license. A maximum of four serial network nodes are allowed in any one serial chain in the network topology.*
- *The optional AETS PCB provides hardware LAN interface for all CTI Open Architecture applications. Each individual CTI Open Architecture application requires one CTX100 CSTA LIC license (maximum nine).*

Strata CTX670 Overview

The Strata CTX670 system provides sophisticated telecommunication features in a modular system designed for growth. Its universal slot architecture enables you to select the combination of Exchange lines, stations, and peripheral options that best suit your needs.

The CTX670 basic processor can be configured for smaller systems as a one or two cabinet system with a capacity of up to 192 Exchange lines and stations combined. It can expand to support up to seven cabinets with a capacity of up to 672 Exchange lines and stations combined (see Figure 1-2).

System line and station capacity is expanded by adding processor expansion Printed Circuit Boards (PCBs), cabinets and line/station PCBs.

The CTX670 easily connects to outside public and private telephone lines. All of the telephones (stations) tied to the system can have direct access to each other as well as to the public and private network.

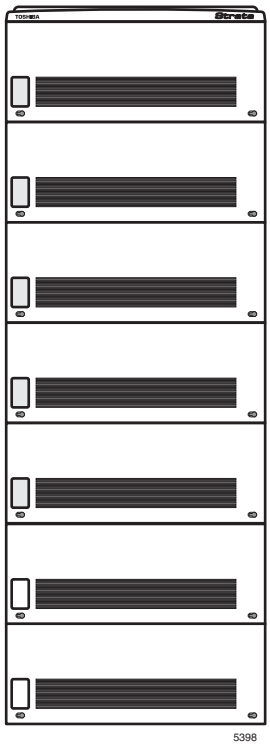


Figure 1-2 CTX 670 Base/Expansion Cabinets

The Base Cabinet and optional Expansion Cabinets are the building blocks of the system. Each system has a Base Cabinet, and can have from one to six Expansion Cabinets. All lines, stations, and options are tied together through the cabinets.

The overall weight and dimensions of the CTX670 cabinets are shown in Table 1-2.

Table 1-2 CTX670 Cabinet Specifications

Cabinet	Weight	Height	Width	Depth
Base Cabinet (CHSUB672F)	14.1kg (31lbs)	29.5cm (11.625in)	67.3cm (26.5in)	26.2cm (10.3in)
Expansion Cabinet (CHSUE672F)	13.2kg (29lbs)	24.8cm (9.75in)	67.3cm (26.5in)	26.2cm (10.3in)

CTX670 Processor PCBs

The system operates with one set of processor PCBs (BECU/BBCU) that install in dedicated slots of the Base Cabinet. The BECU/BBCU processor incorporates the following on-board hardware features:

CPU/Memory

The CTX670 uses a high-speed, 32-bit, Reduced Instruction Set Computing (RISC) processor, Dynamic Random Access Memory (DRAM) working memory, Static Random Access Memory (SRAM) with lithium battery for back-up memory, and flash program memory.

Large-scale Integrated (LSI) circuits

The processor has built-in LSI circuits that support the following:

- *16 built-in DTMF receivers*
- *16 built-in Busy Tone (BT) detectors for Auto Busy Redial (ABR)*
- *64 conference circuits for up to eight party conferences. Up to 96 conference circuits are available using the BEXS. A built-in, adjustable, digital Pad technology that allows audio volume to be adjusted in eight steps to compensate for conference and/or network losses.*

Memory Protection Battery

If commercial AC power is lost or if a system is moved or stored without power, the processor has an internal battery that protects data and the customer's programmed configuration from memory loss. This information will be maintained in a powerless system for at least six years.

Music-on-hold/Background Music Interface

An RCA jack and volume control are built into the processor to interface with a Music-on-hold and/ or Background Music source. With the CTX670, you can have up to 15 MOH/BGM sources by adding:

- *Up to two BIOU PCBs, each provides three MOH/BGM input sources*
- *An RSTU PCB that provides up to eight MOH/BGM input sources*

SmartMedia Memory

The processor has an on-board SmartMedia card slot. A SmartMedia flash memory card can be inserted to backup and restore customer program data. It also makes it easy to upload operating system data for software upgrades and is used for maintenance functions.

Network Interface

The processor has an on-board Ethernet 10base-T Ethernet circuit for connection to Open Architecture Computer Telephony Interface (CTI) applications. This provides extensive call control and telephone support for CTI applications. The Ethernet Network Interface Card (NIC) port also enables connection to the following:

- *CTX Attendant Console*
- *ACD server*
- *Local and Remote CTX WinAdmin PC*
- *Soft Key Control of Voice Mail features*

Maintenance Modem

A built-in maintenance modem (33.6Kbps/V.34) on the processor can provide point-to-point local or remote connection to the CTX WinAdmin administration software.

CTX670 Processor PCB Subassemblies

Subassemblies can be added to the processor PCBs to enable system expansion and provide additional features. The subassemblies are:

- *BEXS and BBMS expansion PCBs mount onto the processor PCBs to provide increased port capacity, from Basic (192 ports) to Expanded (672 ports). The BEXS provides switching capacity, and an additional 16 DTMF receivers and 16 Busy Tone detectors. The BBMS provides memory capacity. For Basic and Expanded capacities of stations, lines and features, see Tables 1-3~1-8. To expand the system, both subassemblies must be installed.*
- *BSIS interface PCB which attaches to the BECU to provide up to four RS-232 interface ports for SMDR Call Accounting and SMDI or Toshiba Proprietary Voice Mail interface.*

See Table 1-3 on Page 1-10 for the number of cabinets and universal PCB slots for the Basic and Expanded systems.

CTX670 License Control

The system size and feature capability is controlled using a software License Key Code. This key code is obtained from (http://www.toshiba-telecoms.co.uk/dealer) during the ordering process and is installed onto the system processor via Strata CTX WinAdmin. Processor license codes activate system hardware capacities in the following increments.

- *The first 64 line/station ports do not require a license. Each additional set of four line/station ports requires one CTX670 PORT LIC license (maximum of 672 ports).*
- *The on-board DTMF receiver circuit provides up to 32 DTMF receiver hardware circuits. The first four DTMF circuits do not require a license. Each additional set of four DTMF receiver circuits requires one CTX670 DTMF LIC license (max. total of 32 DTMF circuits).*

Note DTMF tone receiver circuits are required for standard telephones, Voice Mail DTMF integration, Tie, DDI and DNIS line service.

- *The optional RS-232 serial port interface (BSIS) provides two circuits to interface with Voice Mail SMDI or Toshiba Proprietary Voice Mail integration, Call Accounting SMDR, and two for future applications. The first circuit does not require a license, but circuits two through four each require one CTX670 SERL LIC license.*

The list below outlines all the licenses that can be purchased for CTX670 and their associated capacities.

- CTX670 PORT LIC- Purchase of ONE license will increase system ports by 4. Max 672
- CTX670 DTMF LIC- Purchase of ONE license will increase DTMF receivers by 4. Max 16
- CTX670 CSTA LIC- Purchase of ONE license will increase CSTA sessions by 1. Max 9
- CTX670 QSIG LIC- Purchase of ONE license will enable QSig on the switch.
- CTX670 WOC LIC- Purchase of ONE license will allow 1 WOC to be supported. Max 4.
- CTX670 SERL LIC- Purchase of ONE license will allow 1 serial port to be supported. Max 4 but only two have a use at present.

Licensed Software Options

Some software options are activated with license codes. The following software options require a license:

- *Each CTX system (node) in a Strata Net QSIG Network requires one CTX670 QSIG LIC license. A maximum of four serial network nodes are allowed in any one serial chain in the network topology.*
- *Each individual CTI Open Architecture application requires one CTX670 CSTA LIC license (maximum nine).*

CTX670 Cabinet Slots

Base Cabinet

The Base Cabinet has two dedicated slots used for the system processor PCBs and eight universal slots, labelled "S101~S108," that can accommodate station, Exchange line or option PCBs (see Figure 1-3). It also houses a power supply.

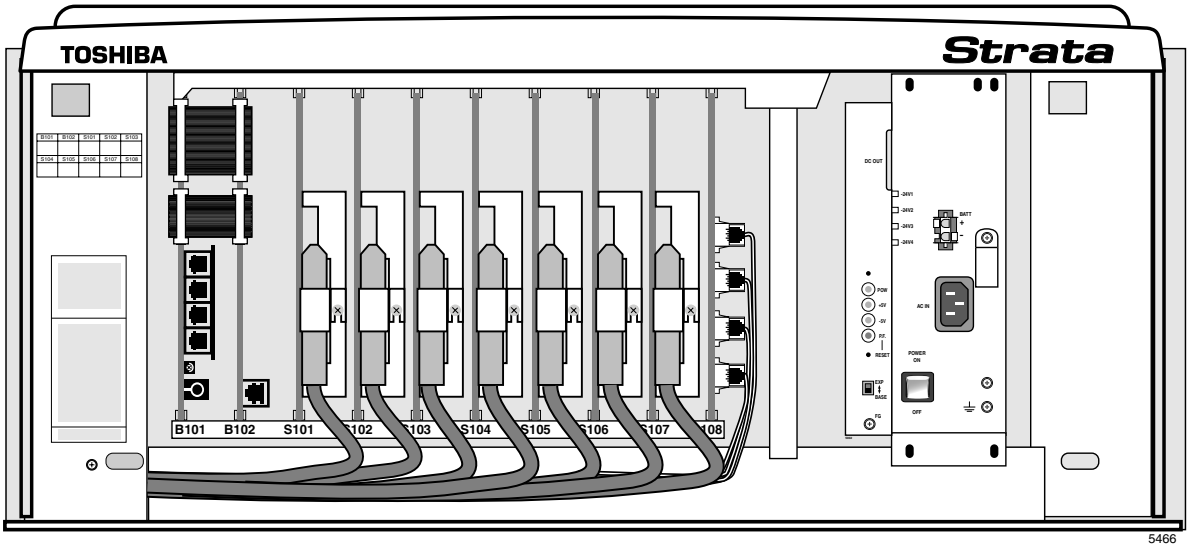


Figure 1-3 Strata CTX670 Base Cabinet Interior

Expansion Cabinets

One to six Expansion Cabinets can be added to increase the system station and Exchange line capacity. Each expansion cabinet provides 10 slots (S_01~S_10). Figure 1-4 shows an Expansion Cabinet.

Refer to the following section for cabinet slot and station/line capacities. Tables 1-5 and 1-6 show the number of stations and Exchange lines allowed when additional cabinets and PCBs are used.

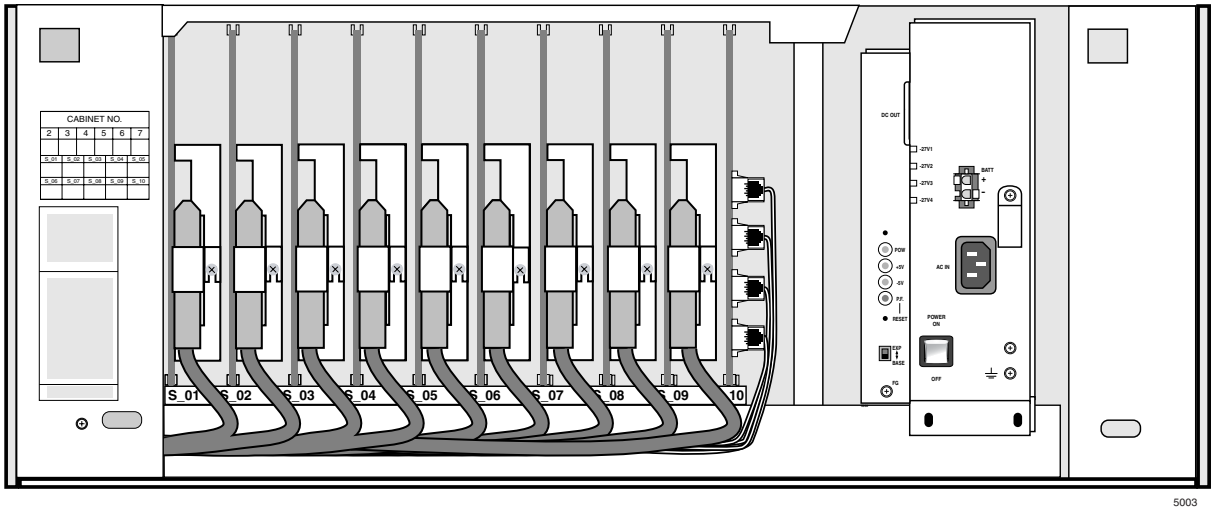


Figure 1-4 Strata CTX670 Expansion Cabinet Interior

CTX670 Remote Expansion Cabinet

A CTX670 Expansion Cabinet can be located up to three kilometers from its Base Cabinet. Remote Expansion Cabinets are enabled by the RRCU PCB. One RRCU connects to up to two ribbon-type Data Cables and applies the inter-cabinet signal to a multi-mode fibre-optic pair. One fibre pair can support one or two expansion cabinets in one remote location using one RRCU in the Base Cabinet and another in the Remote Expansion Cabinet.

The CTX670 Base Cabinet supports up to six Remote Expansion Cabinets (at least one RRCU PCB is required for each remote location).

Remote cabinets support the BIOU for external Page Zones, Night Bell, etc., and all Exchange line and trunk interface PCBs. Network clock synchronisation can only be derived from digital trunks installed in the Base Cabinet (Master) location.

System Capacities

This section contains Strata CTX100 and CTX670 capacities for stations and peripherals, Exchange lines, station buttons and system features. All tables apply to both systems unless otherwise noted.

Important! *The maximum capacities listed for the CTX100 in Tables 1-3~1-8 are based on an expanded CTX100 (Base + Expansion cabinet).*

Table 1-3 Cabinet and Slot Capacities

Cabinets/Slots/Ports	CTX100	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Cabinets	1 or 2	1 to 2	1 to 7
Universal slots	4 or 8	8 or 18	8 to 68
Maximum capacity of ports (lines + stations)	112	192	672

Table 1-4 CTX100 Capacities

Processor ACTU1	Capacity
Maximum Exchange Lines (Analogue)	64
Maximum Exchange Lines (PRI)	64
Maximum Stations	72
Stations+Analogue Lines	96 (ex.64+32)
Stations+T1 &/or PRI Lines **Note** T1 is not available in the UK.	112 (ex.72+60)

Table 1-5 Station/Peripherals System Capacities

Stations	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Add-on modules (DADM3020) per Base Cabinet[1]	30 DKTs with 1 ADM 23 DKTs with 2 ADMs	55 DKTs with 1 ADM 43 DKTs with 2 ADMs	55 DKTs with 1 ADM 43 DKTs with 2 ADMs
Add-on modules (DADM3020) per Expansion Cabinet[1]	31 DKTs with 1 ADM 24 DKTs with 2 ADMs	57 DKTs with 1 ADM 45 DKTs with 2 ADMs	57 DKTs with 1 ADM 45 DKTs with 2 ADMs
CTX Attendant consoles	2	2	4
DKT3000- and 2000-series DKTs[1]	72/system (40 Base Cabinet) (40/Expan. Cab.)	152/system (72 Base Cabinet) (80/Expan. Cab.)	552/system (72 Base Cabinet) (80/Expan. Cab.)
Door locks	4	5	10
Door phone control boxes (DDCB)	2	3	8
Door phones	6	9	24

Table 1-5 Station/Peripherals System Capacities (Cont.)

Stations	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
DSS consoles (DDSS)	3	5	16
ISDN BRI station circuits TE-1 and TA (2B+D per circuit)	12	28	96
Off-premise stations	72	160	560
BPCI used for TAPI only: per cabinet[1]	35	66	66
Total Stations (Digital/Analogue/ISDN BRI B channel combined)	72	160	560
Standard stations	64	160	560
Calls existing at the same time	56	96	366

1. Limit is based on cabinet Power Factor (PF).

Table 1-6 Line Capacities and Universal PCB Slots

Lines	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Exchange lines – loop start (analogue - 8 lines/slot)	64	96	264
Tie lines (analogue - 4 lines/slot)	32	72	264
VoIP lines (4 lines/slot)[1]	8	20	20
ISDN BRI B channel lines[2]	64	96	256
ISDN PRI B channel lines[3]	48	96	264
Total lines (Analogue, ISDN BRI and PRI B channels combined)	64	96	264
Channel Groups	32	48	128
Number of groups with Group Exchange Line buttons	32	50	128

1. Capacity is limited by EU, Part 15, ElectroMagnetic Compatibility (EU) restrictions.
2. BRI lines provide Exchange line services, including Caller ID, DDI and Direct Inward Lines (DIL).
3. PRI lines provide Exchange line services, including QSIG Networking, Calling Party Number/Name, DDI, Tie, POTS, FX and DIT.

Table 1-7 Station Buttons

Station Buttons per System	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Call Forward, Personal CF Buttons	72	160	560
Exchange Line Buttons	64	96	264
Group Exchange Line Buttons	64	96	264
Pooled Exchange Line Buttons	32	50	128
Exchange Group and Pooled Line Buttons	64	96	264
Station Loop Buttons	8	15	50
Door Unlock Buttons	4	8	16
Flexible Telephone Buttons	1600	3500	12000
Line Buttons in use at the same time	1440	3200	3200
Message Waiting Registration (DNs with MW)	130	230	800
Multiple Appearances of DNs on Telephones	2000	4000	12000
Night Transfer Buttons	2	4	8
One Touch Buttons	800	1750	6000
Primary Directory Numbers [PDNs] per system	72	160	560
Phantom Directory Numbers [PhDNs] per system	288	640	2240
[PhDNs] with Message Waiting Indication LED	18	38	128
ISDN DNs	96 (8/ISDN station)	224 (8/ISDN station)	768 (8/ISDN station)

Table 1-8 System Feature Capacities

Features	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Pilot DNs	100	200	256
Advisory LCD Messages (Set on a Telephone)	1	1	1
Advisory LCD Messages Lists (per System)	10	10	10
Attendant Groups	1	1	1
Call Forward, System CF Patterns	4	10	32
Call Park Orbits (General)	14	32	64
Call Park Orbits (Individual)	56	96	336
Caller ID Numbers stored (Call History records)	Up to 100/ station	Up to 100/station	Up to 100/station
	Up to 660/ system	Up to 1000/system	Up to 2000/system
Exchange Line Groups - Incoming Line Groups (ILG)	32	50	128
Exchange Line Groups - Outgoing Line Groups (OLG)	32	50	128
Outgoing Line Groups (OLG) Members per system (Trunks + ISDN Line Service Index)	96	144	392

Table 1-8 System Feature Capacities (Cont.)

Features	CTX100 Base & Expansion	CTX670 Basic Processor BBCU + BECU	CTX670 Expanded Processor BBCU + BECU + BEXS + BBMS
Conference Ports	64	64	96
Conferencing (three-parties simultaneously)	20	21	31
Conferencing (eight-parties simultaneously)	8	8	12
Conference Party types (up to 8 total lines + stations)	6 lines max. 8 stations max.	6 lines max. 8 stations max.	6 lines max. 8 stations max.
Two-Exchange Line Conferencing – simultaneously (Two party only, no telephone or VM port)	32	48	132
Conference/Line Volume Adjustment (Pad) Groups	6	10	32
DDI Numbers for Calling Number Identification/system	225	500	1000
DNIS/DDI Network Routing Numbers	200	400	1000
DNIS/DDI Numbers	450	1000	2000
DTMF Receivers	16	16	32
Emergency Call Groups	8	8	8
Hunt Groups (Serial/Circular/Distributed combined)	90	200	640
Hunt Group Size (DNs per group)	72	160	560
Hunt Group Stations (per system)	360	800	2800
ISDN DNs	96	224	768
ISDN Line Service Indexes	32	48	128
Night Bells	1	1	1
Off-hook Call Announce Handsets (simultaneous)	20	21	31
Off-hook Call Announce Station Speakers [1]	72	112	352
Page Zones - External Speakers (Relay)	8	8	8
Page Groups (Telephones with or without External Zones)	4	6	16
Paging – (Group Paging – simultaneous stations paged)	32	32	32
Pickup Groups	5	10	32
Ring Tones (External Ring Tones for digital telephones)	4	4	4
Ring Tones (Internal Call Ring Tones for digital telephones)	1	1	1
Speed Dial - Station SD numbers per system[2]	1080	2400	5600
Speed Dial - System SD numbers per system	800	800	800
Stratagy DK Voice Mail Systems per system	1	1	1
Tenants	1	1	1
Destination Restriction Level (DRL) Classes	16	16	16
Verified Account Codes	135	300	1000
Voice Mail SMDI Interfaces	1	1	1

1. Speaker OCA capacity is determined by 2B channel slot availability and power supply limits.
2. Up to 100 Station SD numbers can be programmed per station.

Universal Slot PCBs

Universal Printed Circuit Boards (PCBs) installed in the Strata CTX100 or CTX670 cabinets provide interfaces for stations, lines, and peripherals. Each PCB measures 7.5 x 5.5 inches (190 x 140 mm) and mounts in the slot with a 44-pin backplane connector. PCB external connections to station equipment are made to the Main Distribution Frame (MDF) using industry-standard connectors.

Station, Line and Option PCBs

The PCBs are categorised as station, Exchange line or option PCBs (see Tables 1-9~1-11). Feature subassemblies that plug onto a universal slot PCB, such as the Standard Telephone Interface Subassembly (RSTS), are listed below the associated PCB.

Table 1-9 Station PCBs

Digital Telephone Interface Unit (ADKU) (CTX100 only)	
Provides eight circuits for 3000 and/or 2000-series digital telephones.	**Interface Options:** Provides the same interface options as the BDKU (see below), but does not support BDKS. Compatible only with CTX100.
Digital Telephone Interface Unit (BDKU)	
Provides eight circuits for 3000 and/or 2000-series digital telephones (BDKU) + eight more with BDKS (optional).	**Interface Options:** Digital telephones (with or without BHEU, BPCI, BVSU, DADMs, or digital cordless telephone). Supports BDKS. Stand-alone digital cordless telephone DDSS console BATI DDCB Supports large LCD (DKT3014) features.
Digital Telephone Interface Subassembly (BDKS) Provides eight additional circuits for 3000 and/or 2000-series digital telephones. Attaches to BDKU. One per BDKU. Do not use if Speaker OCA is required for BDKU ports.	**Interface Options:** Same as BDKU. Not compatible with ADKU or PDKU.
Digital Telephone Interface Unit (PDKU2)	
Provides eight digital telephone circuits (2000-series phones only. Do not use the PDKU for 3000-series digital telephones.). LCD display is only 16 characters wide and the **Spdial** button will not work.	**Interface Options:** Digital telephones (with or without BHEU or HHEU, DVSU, DADMs, or digital cordless telephone) Stand-alone digital cordless telephone DDSS console DDCB Does not support DKT3014-SDL features.
Internet Protocol (IP) Interface Unit (BVPU)	
Provides four VoIP Circuits as E&M Tie lines One 10baseT port One RS-232 maintenance port H.323 standard for Voice over Internet Protocol (VoIP).	**Interface Options:** LAN, Internet, WAN.

Table 1-9 Station PCBs (Cont.)

Standard Telephone Interface Unit (RSTU3)	
Provides eight standard telephone circuits. Stutter dial tone is provided for Message Waiting audible indication.	**Interface Options:** Standard telephones Voice mail ports Off-premises stations Other similar devices Alternate BGM source Auto Attendant digital announcer Message Waiting lamp Fax machines ACD Announcer
Standard Telephone Subassembly (RSTS) Attaches to RDSU. Provides two additional standard telephone circuits. One maximum per RDSU.	**Interface Options:** Same as RSTU, except no Message Waiting lamp.
-48 Volt Supply Internal Option (R48S)	
Attaches to RSTU and RDSU 48VDC circuit for up to eight standard telephone circuits.	**Interface Options:** Optionally interfaces to the RSTU and RDSU to extend loop length of standard telephones from 600 ohms to 1200 ohms. Required for OPS operation.
Stratagy DK	
Provides two, four, six, or eight VM ports. All of the above Stratagy DK systems use eight station ports of Strata CTX capacity.	

Table 1-10 Exchange Line PCBs

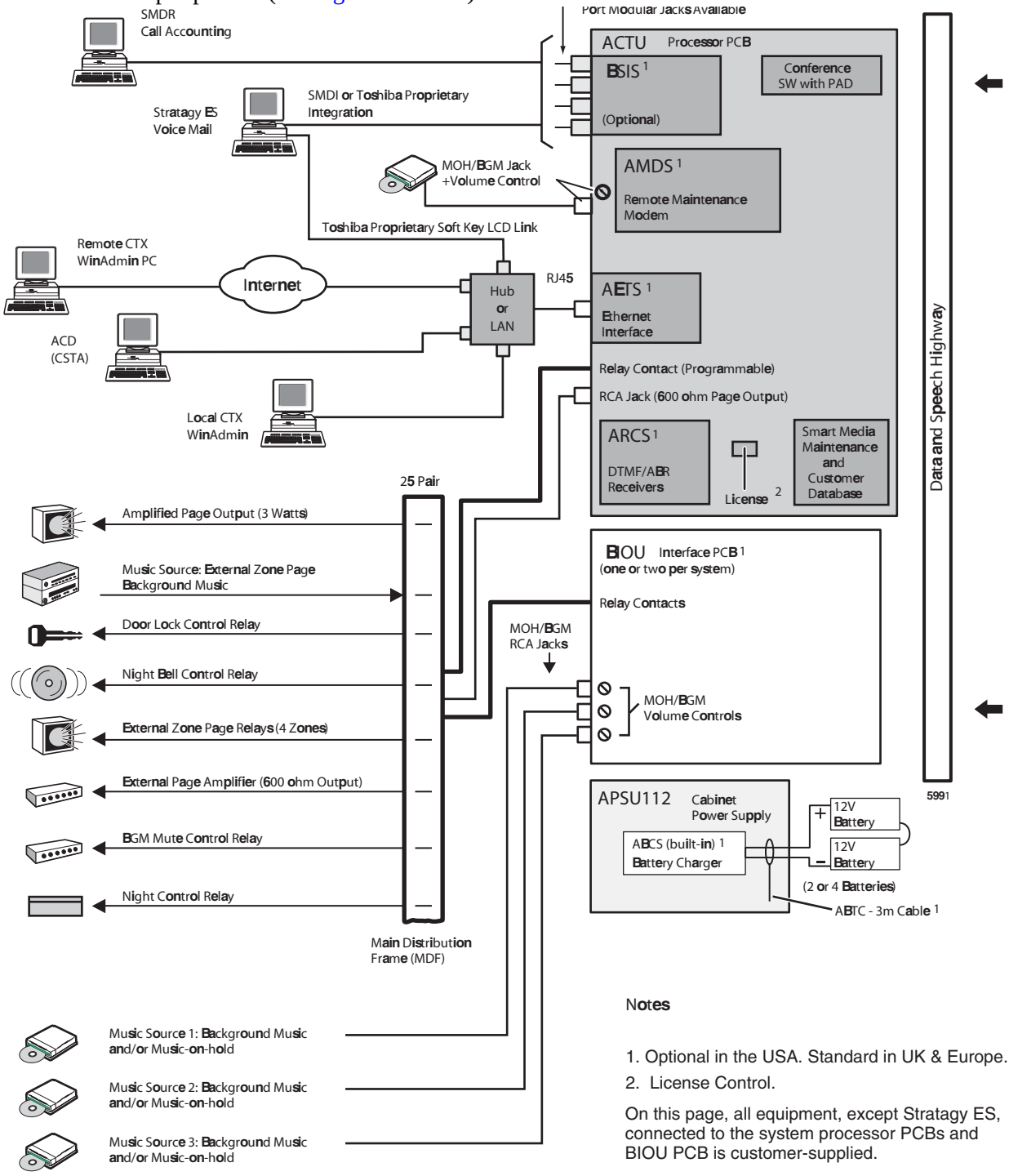
ISDN S/T-type Basic Rate Interface Unit (RBSU)	
Two ISDN BRI S/T point circuits (NT or TE). Each circuit is 2B+1D. (Host for the RBSS.)	**Interface Options:** Network and/or station side.
Basic Rate Interface Subassembly (RBSS) Attaches to attaches to RBSU. One RBSS subassembly per RBSU. Two ISDN BRI, S point circuits (2B+D each).	**Interface Options:** Station side only.
ISDN Primary Rate Interface Unit (RPTU2)	
Provides (1~30B + D) channels (lines). RPTU2 is required for QSIG Networking.	**Interface Options:** ISDN PRI QSIG
Loop Start Exchange Line Interface Unit (RCOU)	
Provides four Exchange analogue loop start line circuits. With RCOS, provides eight Exchange analogue loop start line circuits.	**Interface Options:** Exchange analogue loop start lines
Loop Start Exchange Line Interface Subassembly (RCOS) Provides four additional Loop Start Exchange lines. One RCOS subassembly per RCOU.	Same as RCOU.
Remote Expansion Cabinet Unit (RRCU)	
Supports two CTX670 remote cabinets. 62.5 mμ, multi-mode fibre.	Remote cabinet not supported by main system reserve power.
Tie Line Unit (REMU2)	
Provides four analogue Tie line circuits.	**Interface Options:** E&M Tie lines Two- or four-wire transmission Immediate start Wink start
Tie Line Unit (PACU2)	
Provides four analogue Tie line circuits.	AC 15 Tie lines

Table 1-11 Option PCBs

Option Interface Unit (BIOU)	**Interface Options:** Provides Paging output (600 ohm and three-watt amp), four zone paging relays, three MOH interfaces and four control relays (Night Transfer and BGM mute).

Functional Block Diagrams

The Functional Block Diagrams show the PCBs and interface connectors used for connecting the stations and peripherals (see Figures 1-5~1-8).



Notes

1. Optional in the USA. Standard in UK & Europe.
2. License Control.

On this page, all equipment, except Stratagy ES, connected to the system processor PCBs and BIOU PCB is customer-supplied.

Figure 1-5 CTX100 System Processor and Option Interface PCBs

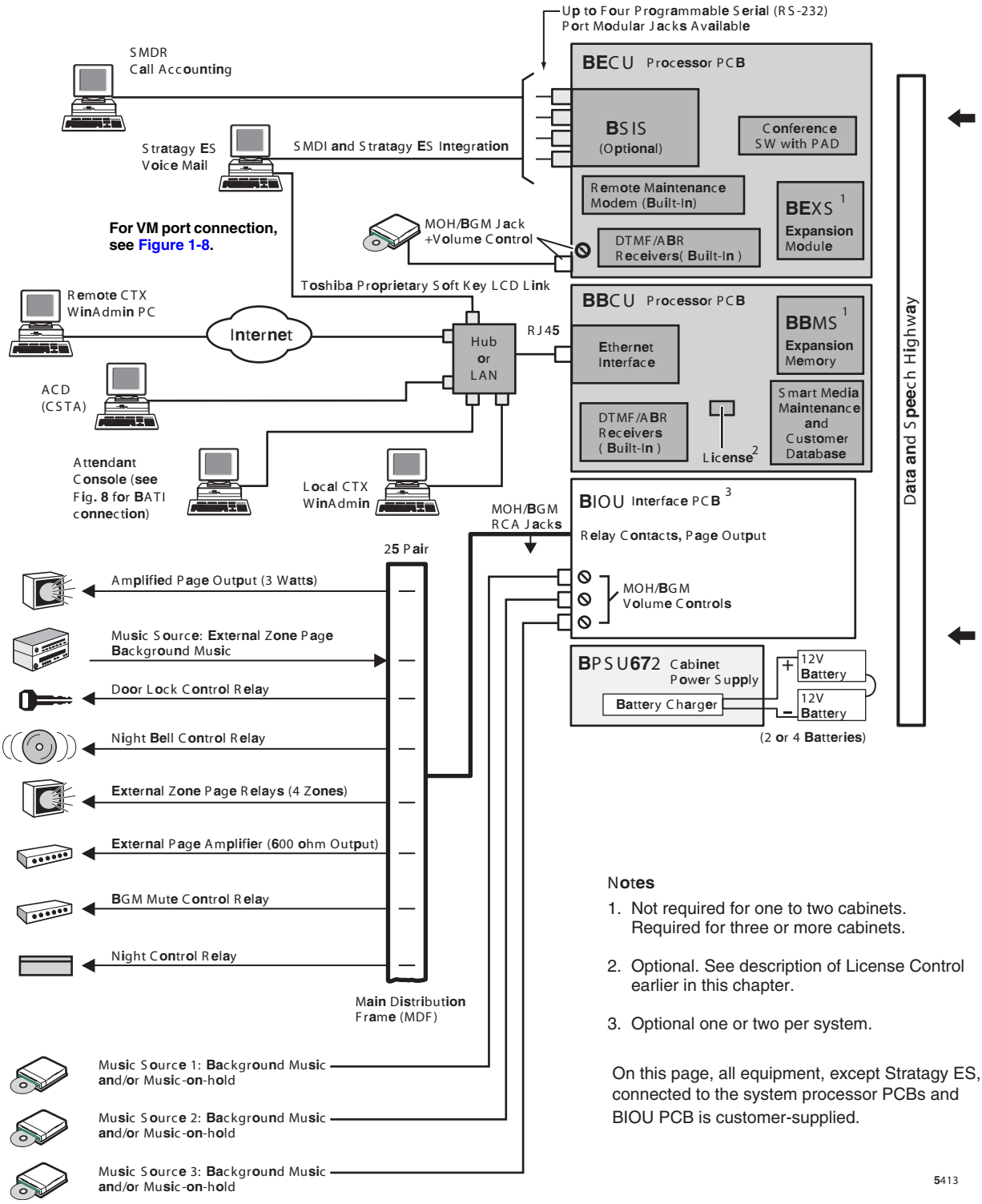


Figure 1-6 CTX670 System Processor and Optional Interface PCBs

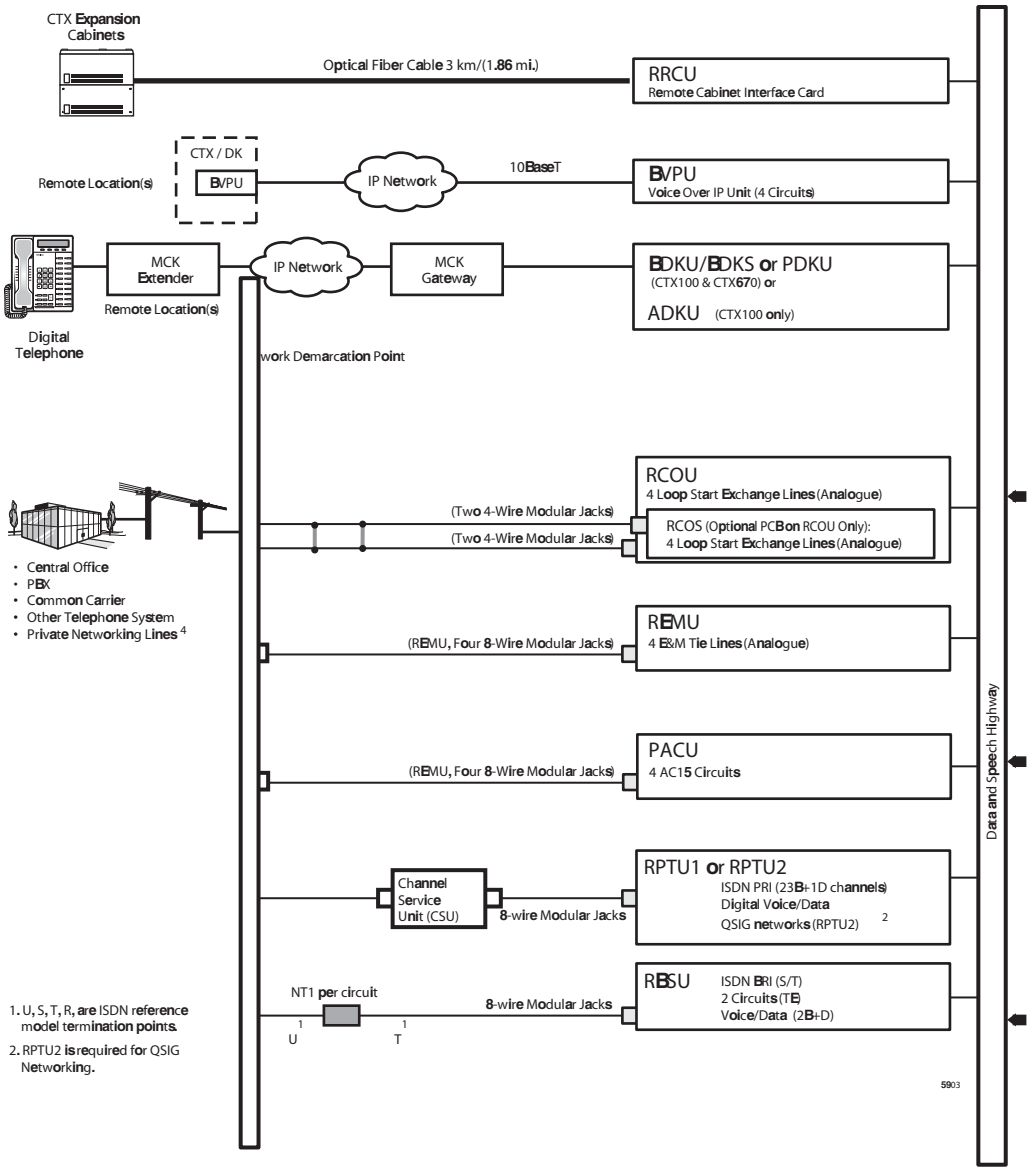
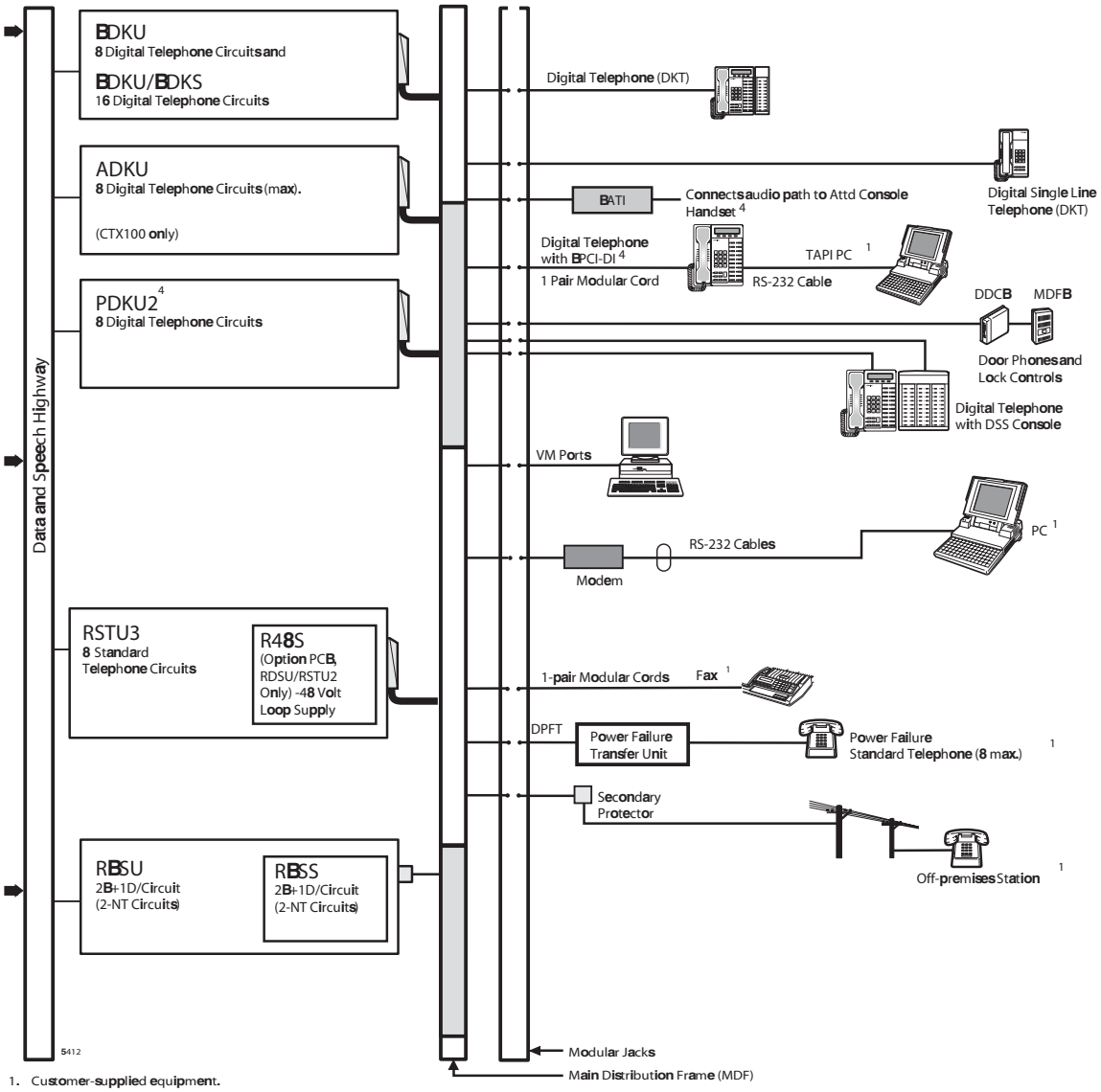


Figure 1-7 CTX100 and CTX670 Exchange Line Side Functional Block Diagram



1. Customer-supplied equipment.
2. RSTU2 or above is required for standard telephone message waiting lamp.
3. U, S, T, R are ISDN reference model termination points.
4. PDKU and RDSU should only be used for 2000-series digital telephones. They do not support all of the 3000-series digital telephone features, including LCD. The PDKU also does not support BPCI, BATI and the CTX Attendant Console.

Figure 1-8 CTX100 and CTX670 Station Side Functional Block Diagram

Strata CTX100 Cabinet Slot Configuration Considerations

Write in the PCBs installed in each cabinet slot in the Cabinet Diagram below. Use the PCB placement guideline below to place PCBs in the correct slots. A number of tables provide CTX100 capacities and configuration examples in this section.

CTX Base Cabinet Slots					CTX Expansion Cabinet Slots			
ACTU	S101	S102	S103	S104	S105	S106	S107	S108
(AETS___) (AMDS__) (ARCS__) (BSIS__)								

For cost-effective configurations, try to fit all PCBs into the CTX100 Base Cabinet. This allows up to 16 loop start Exchange lines and 32 DKTs, and up to 30 PRI Exchanges by 40 DKTs.

- *If 9~16 DKTs require Speaker OCA, place BDKU/BDKS PCBs in S103 if it is available.*
- *Consult the following tables of maximum system capacity slot configurations as guidelines for PCB slot placement.*
- *Check system capacities in Tables 1-3~1-8 to confirm that the features to be used are within limitations.*

Notes

1. Always check the cabinet power factors see "System Power Factor Check Considerations" on Page 1-27 to make sure the installed PCBs and telephones do not exceed the power factor limitations.
2. ACTU processor optional subassembly functions (see "CTX100 Processor Optional Subassemblies" on Page 1-3). Any PCB plus its PCB subassembly can be installed in any slot with the exception of RPTU PCBs which should be installed in S103 and BDKU/BDKS PCBs that support Speaker OCA.
3. RPTU PCBs can be placed in any odd numbered slot using the following rules:
   - If RPTU is placed in Slot 103 (preferred) with 30 channels, another PCB can still be installed in S104.
   - If RPTU is placed in Slots 101, 105, or 107 another PCB can not be installed in the next slot.
4. Digital telephone PCBs that support Speaker OCA can be placed in slots using the following rules:
   - If ADKU, BDKU (without BDKS) or PDKU must support Speaker OCA, it can be installed in any slot; another PCB can be installed in the next even slot.
   - If a BDKU/BDKS PCB must support Speaker OCA it can only be installed in Slot 103; another PCB can be installed in S104.

CTX100 Base Only: Digital Telephones and PRI lines

RPTU2 (PRI) is limited to 48 channels.

Table 1-12 CTX100 CTX Base Cabinet with PRI lines

4 Universal Slots 40 Stations (Max.) 48 lines (Max.) 64 Stations + PRI lines combined (Max.)		
Table No.	**Stations**	**PRI lines**
1-13	40	30

Table 1-13 CTX100 Base: 40 stations and 30 PRI lines

S101	S102	S103	S104[1]
BDKU/ BDKS	BDKU/ BDKS	RxTU2[2]	ADKU
16 DKTs	16 DKTs	30 lines	8 DKTs

1. S104, only 8 DKTs because of cabinet power factor.
2. RxTU2 could be RPTU2 (PRI)

CTX100 Base & Expansion: Digital Telephones and PRI lines

8 Universal Slots 72 Stations (Max.) 64 lines (Max.) 112 Stations + PRI lines combined (Max.)	
Stations	**PRI lines[1]**
72	40/40
64	48/48
56	56/48
48	64/48

1. PRI lines are limited to 48B channels.

Strata CTX670 Cabinet Slot Configuration

The cabinet diagram below enables you to write in the PCBs installed in each cabinet slot. Use the PCB placement guideline below to place PCBs in the correct slots. Fill in the PCBs that go into each slot. Always ensure that the cabinet power factors do not exceed 85. See the notes below and Table 1-19~Table 1-24.

Main Location _____ Remote Location 1___ 2___ 3___ 4___ 5___ 6___

CTX Cabinet Slots										
Base	**B101**	**B102**	**S101**	**S102**	**S103**	**S104**	**S105**	**S106**	**S107**	**S108**
PCB Type	**BECU** (BEXS) (BSIS)	**BBCU** (BBMS)								
Cab 2	**S201**	**S202**	**S203**	**S204**	**S205**	**S206**	**S207***	**S208***	**S209***	**S210***
PCB Type										
Cab 3	**S301**	**S302**	**S303**	**S304**	**S305**	**S306**	**S307***	**S308***	**S309***	**S310***
PCB Type										
Cab 4	**S401**	**S402**	**S403**	**S404**	**S405**	**S406**	**S407***	**S408***	**S409***	**S410***
PCB Type										
Cab 5	**S501**	**S502**	**S503**	**S504**	**S505**	**S506**	**S507***	**S508***	**S509***	**S510***
PCB Type										
Cab 6	**S601**	**S602**	**S603**	**S604**	**S605**	**S606**	**S607***	**S608***	**S609***	**S610***
PCB Type										
Cab 7	**S701**	**S702**	**S703**	**S704**	**S705**	**S706**	**S707***	**S708***	**S709***	**S710***
PCB Type										

Notes

- B101 (BECU)/B102 (BBCU) – Main processor slots. BEXS, BBMS, BSIS are optional subassembly PCBs (see "CTX100 Processor Optional Subassemblies" on Page 1-3).
- Cabinet slots marked with * provide 8 time slots; all other slots provide 16 time slots.
- Any combination of up to 96 (basic processor) or 264 (expanded processor) RPTU channels can be installed in the CTX670.
- RPTU PCBs can only be placed in odd slots of the Base Cabinet and slots S_01, S_03, and S_05 in any Expansion Cabinet. If 17 or more channels are used, the next highest slot adjacent to the RPTU slot *cannot* be used. Slots adjacent to 8 or 16 channel RPTU PCBs can be used.
- BDKU, PDKU, RDSU without Speaker OCA can be in any available slot in any cabinet.
- BDKU, PDKU, RDSU with Speaker OCA can be in any available slots in the Base and S_01~S_06 in all Exp. Cabs.
- BDKU/BDKS without Speaker OCA can be in any available slots in the Base and S_01~S_06 in the Expansion Cabs. **Do not install Speaker OCA telephones on BDKU/BDKS.**
- Maximum 80 digital telephones per shelf due to the Power Factor restriction.
- For more details, see the following Placement Guidelines section.
- Not all PCB's are available in the UK (ie RDSU).

PCB Placement Guidelines

Install the RRCU PCBs in the Base Cabinet first. Station, line and option PCBs can be mixed in cabinets in any pattern. Do not skip slots except for vacant slots that provide RPTU capacity. Also, do not skip slots except for vacant slots that provide for BBKU/BDKS with Speaker OCA. Toshiba recommends placing the RPTU and BDKU/BDKS PCBs first because they have special placement rules. Use the following numbered sequence as a guide to installing the PCBs.

CAUTION! When placing PCBs, do not install more than five BDKU/BDKS PCBs in the same cabinet. Five BDKU/BDKS PCBs support 80 digital telephones, which brings the cabinet power factor to 82.25. Adding more PCBs of any type to a cabinet that has five BDKU/BDKS PCBs may cause the cabinet to exceed it's power factor (85 max.). See "System Power Factor Check Considerations" on Page 1-27

Step 1: Processor PCBs

- *BECU (Slot B101)/ BBCU (slot B102), are required for system operation. The BECU/BBCU will support up to two cabinets without the BEXS/BBMS expansion subassemblies.*
- *BEXS and BBMS subassembly PCBs are required for 3 to 7 cabinet systems or systems withe more than 192 ports.*
- *BSIS subassembly PCB is required for SMDR and/or SMDI or Toshiba Proprietary Voice Mail RS-232 interface.*

Note The BECU/BBCU is licensed for 64 ports and four DTMF receivers from the factory. If more capacity is required additional licenses must be uploaded to the processor.

Step 2: Remote Cabinet PCBs

- *RRCU PCBs installed in the main location can be placed in Base Cabinet slots S102~S108 in any order. Before installing other PCBs make sure there is a Base Cabinet slot available for each RRCU PCB needed. An RRCU may occupy a vacant slot adjacent to RPTU. An RRCU PCB in a remote location can support one or two remote cabinets and can be installed in any slot of either cabinet.*

  The number of RRCU PCBs required in the Base and Remote Cabinet locations is shown in Table 1-14:

Table 1-14 Main Processor PCB/ Remote Cabinet Configuration

RRCU PCBs Needed in Base Cabinet	Remote Cabinet Configuration	RRCU PCBs Needed at Remote Location (s)
1	1 or 2 Remote Cabinets in one location	1
2	2 to 4 Remote Cabinets in two locations or 3 to 4 Remote cabinets in one location.	2
3	3 cabinets if cabinets are in separate remote locations.	3
4	4 cabinets if cabinets are in separate remote locations.	4
5	5 cabinets if cabinets are in separate remote locations.	5
6	6 cabinets if cabinets are in separate remote locations.	6

- *Cables are provided according to the connectors on the RRCU card to which they are attached. See Table 1-15 for connector information.*

Table 1-15 Remote Cabinet Data Cables and Connectors

Data Cables	RRCU Connectors			
	M1	S1	M2	S2
BDCL1A-MS1	X	X		
BDCL1A-M2			X	
BDCL1A-S2				X

X = Applies to connector.

Step 3: BIOU Interface PCB

- *Up to two BIOU PCBs can be installed in any local/remote cabinet slot, except the BIOU may not occupy a vacant slot adjacent to RPTU.*

Step 4: ISDN PRI Digital Line PCBs

RPTU must be placed in designated slots as described below. The RPTU PCB can provide up to 30 ISDN PRI lines. The RPTU PCB can be installed into any of the following slots. Please note that the slot on the right hand side next to the RPTU PCB **MUST** be kept vacant.

Important! *RPTU2 is required for QSIG Networking.*

Base Cabinet	103, 105, 107	
Expansion Cabinet	_01, _03, _05	_ = Cabinet Number

Step 5: Digital and Standard Telephone Station PCBs and the Stratagy DK Voice Mail PCB

- BDKU (+ optional BDKS), PDKU, *RSTU, RDSU/RSTS and the Stratagy DK: Each PCB or PCB combination requires one slot. Refer to the Notes under the cabinet diagram in "Strata CTX670 Cabinet Slot Configuration" to determine into which slots these PCBs can be installed.* BDKU/ BDKS, PDKU, *RSTU and RDSU/RSTS PCBs cannot be installed in slots left vacant for RPTU. Each PCB provides up to eight circuits for the type of stations or Voice Mail ports it supports, except BDKU with BDKS which provides 16 circuits for digital telephones.*

Step 6: ISDN BRI Digital Station PCBs

- *RBUU, RBUU with RBUS, RBSU, RBSU with RBSS: Each PCB or PCB combination requires one slot. These PCBs can be installed in any slot, except a slot is left vacant to provide capacity for* RPTU. *Each single PCB provides two BRI circuits and combination PCBs provide four BRI circuits, for the type of BRI stations it supports. Each ISDN BRI station requires one BRI circuit.*

Step 7: Analogue and VoIP Tie Line PCBs

- *RDDU, RCOU, RCOU with RCOS, RGLU, REMU, and BVPU: Each PCB or PCB combination requires one slot. These PCBs can be installed in any slot, except a slot that is left vacant to provide capacity for RPTU. Each PCB provides up to four circuits for the type of lines it supports, except RCOU with RCOS which provides eight circuits.*

Step 8: ISDN BRI Digital Line PCBs

- *RBUU, RBUU with RBUS, RBSU, RBSU with RBSS: Each PCB or PCB combination requires one slot. These PCBs can be installed in any slot, except a slot that is left vacant to provide capacity for RPTU. Each single PCB provides 2 BRI circuits (four lines) and combination PCBs provide four BRI circuits (8 lines), for the type of BRI Line it supports. Each ISDN BRI circuit provides two lines for the Strata CTX system.*

Step 9: Power Factor

- *After the Cabinets are configured calculate the power factor of each cabinet using "System Power Factor Check Considerations" on Page 1-27.*

Step 10: Check Systems Capacities

- *Check systems capacities in Tables 1-3~1-8 to confirm the features to be used are within limitations.*

System Power Factor Check Considerations

The Strata CTX power supply was engineered for maximum cost efficiency to provide power for the most configurations. Because of this design, there are some -24VDC power limitations for telephone option hardware.

Each telephone/device and PCB has been assigned Power Factors (PFs) that reflect the amount of power supply resources they consume. The Power Supply Unit has also been assigned Power Factors that reflect how much power it can supply. To make sure the cabinet power supply is operating within its limit, it is necessary to add up the PFs of each telephone/device and PCB installed in each cabinet to verify that their total PFs do not exceed the Power Supply PF.

Use the tables provided on pages 1-29 and 1-30 to calculate that each cabinet PF is within limits.

Important!

Power Factor Considerations:

- *The individual PCB and telephone power factors can be found on page 1-29.*
- *The sum of all PCB and telephones **–24VDC PF**s in a given cabinet cannot exceed:*

  85 for CTX670
  45 for CTX100
- *The sum of all PCB **+5VDC PFs** in a given cabinet cannot exceed:*

  40 for CTX670
  20 for CTX100

  Telephones do not have +5VDC PFs.
- *If a cabinet PF is exceeded it is necessary to reconfigure the cabinet to meet PF limits.*
- *If a cabinet's Power Factor is exceeded, cabinet or connected peripherals may malfunction during ringing or voice paging, whereas normal operation will occur for idle telephones.*
- *The Strata CTX100 and CTX670 power supplies provide a PF alarm LED and reset button. If this LED is on, reset it with the reset button. Then recheck the cabinet PFs to make sure they are within limits.*

Notes

1. PCB Power Factor calculation examples are shown in Tables 1-16 and 1-17.
2. Please note some of the PCB's are only available in the US.

Table 1-16 Strata CTX Base Cabinet Example

PCB	Quantity	+5VDC PF	-24VDC PF
PDKU	2	1.6	0.6
RBSU + RBSS	1	3.1	0.3
RCOU + RCOS	1	3.6	4.0
BBCU	1	4.5	2.0
BECU	1	4.5	2.0
Total	**6**	**17.3**	**8.9**

Table 1-17 Strata CTX Expansion Cabinet Example

PCB	Quantity	+5VDC PF	-24VDC PF
RBSU + RBSS	1	3.1	0.3
RCOU + RCOS	1	3.6	4.0
Total	2	6.7	4.3

Table 1-18 shows the individual PCB +5VDC and -24VDC power factors.

Table 1-18 PCB and Power Supply Power Factors

PCB Type	+5VDC PF	-24VDC PF
ACTU	1.1	0.5
ADKU	0.8	0.3
ARCS	0.0	0.0
AETS	0.2	0.1
AMDS	1.3	0.5
ASTU	0.3	0.5
BBCU1	4.5	2.0
BECU1	4.5	2.0
BBMS1	0	0
BEXS1	2.0	1.0
BSIS1	1.0	0.5
BDKU1	0.8	0.3
BDKS1	0.4	0.15
BIOU1	1.5	6.6
PCOU1, 2	1.9	2.0
PDKU1, 2	0.8	0.3
R40S1	0.0	2.8
RBSS1	0.6	0.3
RBSS2	0.0	0.3
RBSU + RBSS	3.1	0.3
RBSU1	2.5	1.0
RBSU2	0.0	1.0
RBUS1	0.0	0.3
RBUU1	0.0	1.0
RCIS1	0.3	0.1
RCIU1, 2	0.7	0.2
RCIU2	0.7	0.2
RCMS1	0.6	0.3

PCB Type	+5VDC PF	-24VDC PF
RCOS1, 2	1.7	2.0
RCOU (4 CO)	2.5	2.0
RCOU + RCOS (8 CO)	3.6	4.0
RCOU1, 2	1.9	2.0
RDDU1	2.6	7.0
RDSU1 (-24VDC)	1.1	0.3
RDSU1 + R48S1 (-48VDC)	1.1	0.5
REMU2/PEMU1	1.0	7.5
RGLU1, 2	2.1	2.5
RMCU1	0.7	0.3
RPTU1, 2	2.6	1.0
RSTU1, 2, 3 (-24VDC)	1.4	0.5
RSTU1+ R48S (-48VDC)	1.4	1.0
RSTU2, 3 + R48S (-48VDC)	4.0	2.3
BVPU1	0.0	3.5
RRCU1	0.0	4.0
RDSU1 (-24VDC)	1.1	0.3
Power Supply APSU112 (CTX100)	**(20.0)**	**(45.0)**
Power Supply BPSU672 (CTX670)	**(40.0)**	**(85.0)**

Table 1-19 Power Factor Check For CTX100

PCB	Qty.	-24VDCPF	+5VDCPF	Sub Total	
				-24VDFPF	+5VDFPF
ACTU	1	0.5	1.1	0.5	1.1
ARCS	1	0.0	0.0	0.0	0.0
AMDS	1	0.5	1.3	0.5	1.3
AETS	1	0.1	2.0	0.1	2.0
BSIS	1	0.5	1.0	0.5	1.0
BDKU	3	0.3	0.8	0.9	2.4
BDKS	2	0.15	0.4	0.3	0.8
RPTU	1	1.0	2.6	1.0	2.6
ASTU	1	0.5	0.3	0.5	0.3
DKT	39	1.0	0.0	39.0	0.0
Standard Phone	2	0.5	0.0	1.0	0.0
			Total	44.3	11.5

APSU112F Power Supply: -24VDCPF=45.0
+5VDCPF=20.0

Cabinet Power Factor Check

1. Enter the PCB Type and PCB Power Factor for each cabinet slot (see Worksheet 6 and 7 for PCB slot configuration).
2. Total the PCB PF for each cabinet.
3. Make sure the Total Cabinet PFs do not exceed the limits noted below. If either PF exceeds its limit, adjust the PCB/telephone placement to meet the PF requirement.

Note Total +5VDC PF of PCBs must be less than 20 for each CTX100 cabinet and 40 for each CTX670 cabinet. Total -24VDC PF of PCBs and telephones must be less than 45 for each CTX100 cabinet and 85 for each CTX670 cabinet.

CTX100

Table 1-20 CTX100 Cabinet Power Factor Check

CTX100 Base Cabinet			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
ACTU	ACTU	2.6	1.1[1]
S101			
S102			
S103			
S104			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX100 Expansion Cabinet			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S105			
S106			
S107			
S108			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

1. Power factor includes ACTU and all ACTU option PCBs.

CTX670

Table 1-21 CTX670 Cabinet Power Factor Check

CTX670 Cabinet 1 (base)			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
B101			
B102			
S101			
S102			
S103			
S104			
S105			
S106			
S107			
S108			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 2			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S201			
S202			
S203			
S204			
S205			
S206			
S207			
S208			
S209			
S210			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 3			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S301			
S302			
S303			
S304			
S305			
S306			
S307			
S308			
S309			
S310			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 4			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S401			
S402			
S403			
S404			
S405			
S406			
S407			
S408			
S409			
S410			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 5			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S501			
S502			
S503			
S504			
S505			
S506			
S507			
S508			
S509			
S510			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 6			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S601			
S602			
S603			
S604			
S605			
S606			
S607			
S608			
S609			
S610			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX670 Cabinet 7			
Slot	**PCB Type**	**PCB +5VDC PF**	**PCB -24VDC PF**
S701			
S702			
S703			
S704			
S705			
S706			
S707			
S708			
S709			
S710			
Total PCB PF			
Total Phone PF			
Total Cabinet PF			

CTX Primary AC and Reserve Power Considerations

CTX100 AC Power Considerations

The power supply in each Strata CTX100 Base and Expansion Cabinet furnishes power to all of the stations and some of the interface peripherals (see Table 1-22). The primary AC power for each cabinet is 240VAC.

Table 1-22 Strata CTX100 Electrical Characteristics

Strata CTX100 Primary AC Power Voltage	
Input AC AC Frequency Watts per cabinet (maximum)	240VAC 50 - 60 Hz 100 watts (maximum)
Strata CTX100 Primary Power Current Consumption (Rating in Amperes)	
	240VAC
1 cabinet 2 cabinets	0.7 amps 1.4 amps
Power Supply Unit (APSU112A)	
DC voltage output specification	-24VDC (-26.3~-27.8VDC, 3.2 DC amps) +5VDC (+4.5~5.5VDC, 2.0 DC amps) -5VDC (-4.5~-5.5VDC, 0.2 DC amps) +3.3VDC (+3.0~3.6VDC, 0.5 DC amps

CTX670 AC Power Considerations

The power supply in each Strata CTX670 Base and Expansion Cabinet furnishes power to all of the stations and some of the interface peripherals (see Table 1-23). The primary AC power for each cabinet is 240VAC.

Table 1-23 Strata CTX670 Electrical Characteristics

Strata CTX670 Primary AC Power Voltage	
Input AC AC Frequency Watts per cabinet (continuous) Watts for five cabinet system	240VAC 50Hz 180 900
Strata CTX670 Primary Power Current Consumption (Rating in Amperes)	
	240VAC
1 cabinet 2 cabinets 3 cabinets 4 cabinets 5 cabinets 6 cabinets 7 cabinets	2.0 amps 4.0 amps 6.0 amps 8.0 amps 10.0 amps 12.0 amps 14.0 amps
Power Supply Unit (BPSU672)	
DC voltage output specification	-24VDC (-26.3~-27.8VDC, 6.0 DC amps) +5VDC (+4.5~5.5VDC, 4.0 DC amps) -5VDC (-4.5~-5.5VDC, 0.8 DC amps)

Determine CTX670 system miscellaneous power components in the following worksheet. (See Tables 1-26 and 1-29 for component descriptions.) These components are not used on CTX100 systems.

Enter the number of cabinet power components needed:

Main Location _____ Remote Location 1___ 2___ 3___ 4____5___ 6____

CTX670 Cabinet Power Components	Enter the Number Required	
Spare Power Supply	BPSU672	
AC Power Strips	RPSB2	
	BPSB240	
208/240VAC Power Supply Cord	BACL240	
Battery Cables	PBTC-3M	
	BBTC1A-2.0M	
Battery DIstribution Box	BBDB	
Conduit Box	BCCB120	
	BCCB240	
Floor Mount Stand	BFIF	

Reserve Power (CTX100 and CTX670)

Two or four customer-supplied 12VDC reserve batteries (80 ampere-hours max.) can be connected to either system to maintain normal operation during a power failure (see Tables 1-24~1-27). The batteries are kept in a highly-charged state by the power supply's battery charger and must be connected when the system is operating normally. Fully charged batteries must be connected when normal AC power is available, batteries cannot be connected after/during an actual power failure.

Table 1-24 CTX100 Reserve Power Characteristics

Battery Charger Characteristics	Maximum Battery Charger Drain (-24VDC)	
Charger: current limiting Nominal float voltage: 2.275 volts/cell Charge current: 280mA amps maximum Battery discharge cut-off voltage: 20.5 ±0.5VDC	Base Cabinet Base + Expansion Cabinets	3.15 amps 6.30 amps

Table 1-25 CTX100 Typical Reserve Power Duration Estimates[1]

Number of Cabinets	1	2
Estimated operation time Two-battery configuration	25 hr.	12.5 hr.
Estimated operation time Four-battery configuration	50 hr.	25 hr.
DC Current Drain (-24VDC)	3.15 amps.	6.30 amps.

1. Assumes 80 ampere-hours with 12VDC batteries.

Table 1-26 CTX670 Reserve Power Characteristics

Battery Charger Characteristics	Maximum Battery Charger Drain (-24VDC)			
Charger: current limiting Nominal float voltage: 2.275 volts/cell Charge current: 0.7 amps maximum Battery discharge cut-off voltage: 20.5 ±0.5VDC	1 cabinet 2 cabinets 3 cabinets 4 cabinets	6.0 amps 12.0 amps 18.0 amps 24.0 amps	5 cabinets 6 cabinets 7 cabinets	30.0 amps 36.0 amps 42.0 amps

Table 1-27 CTX670 Typical Reserve Power Duration Estimates[1]

Number of Cabinets	1	2	3	4	5	6	7
Estimated operation time Two-battery configuration	12.0 hr.	6.0 hr.	4.0 hr.	3.0 hr.	2.5 hr.	2.0 hr.	1.8 hr.
Estimated operation time Four-battery configuration	24.0 hr.	12.0 hr.	8.0 hr.	6.0 hr.	5.0 hr.	4.0 hr.	3.5 hr.
DC Current Drain (-24VDC)	4.6 amps.	8.7 amps.	12.8 amps.	16.9 amps.	21.0 amps.	25.1 amps.	29.2 amps.

1. Assumes 80 ampere-hours with 12VDC batteries.

Primary/Reserve Power Cabinet Hardware

The type of cabinet mounting can have an effect the power requirements. There are two types of mounting for the CTX100 and CTX670 (listed below).

- **Cabinet Wall Mounting** – *The lightweight and compact design of CTX100 and CTX670 enables easy wall mounting. Wall Mounting requires no special hardware.*
- **Cabinet Floor Mounting** – *Only the CTX670 can be floor mounted (requires the BFIF hardware kit). If floor mounting three or more cabinets, AC and reserve power must be connected to the BCCB conduit connection box option by a licensed electrician. If more than two cabinets require reserve power batteries, the BBDB must be installed.*

Underwriters' Laboratory (UL) and local electrical codes require certain standards for connecting commercial AC and reserve power to the Strata CTX system. Tables 1-26 and 1-29 describe which assemblies may be required to meet UL and local electrical code standards.

The power distribution hardware for the CTX100 is shown in Table 1-28.

Table 1-28 CTX100 Cabinet Power Distribution Hardware

Option	Description
APSU112	Strata CTX100 cabinet power supply is supplied with each cabinet. Operates with 240VAC as the system's primary power source and requires 1.8 amps AC per cabinet. The power supply AC cord is 152.4 cm (5 ft.) long with a standard three prong plug.
ABTC-3M	A three-meter long battery cable is used to connect reserve power batteries to the ABCS battery charger when the system has less than three cabinets. One reserve power cable is required for each cabinet.
ABCS	Option battery charger that is installed on the APSU112 power supply. One per cabinet is required with the ABTC-3M if connecting reserve power batteries to the CTX100. **Note** ABCS is built in on UK & European products.

Table 1-29 CTX670 Power Cabinet Hardware

Option	Description
BPSU672	Strata CTX670 cabinet power supply must be ordered for each cabinet. Operates with 240VAC connected as the system's primary AC power source. It automatically detects and adjusts to the type of primary AC power that is connected. The power supply is included with each cabinet ordered but must be installed in the field.
PBTC-3M	A three-meter (9.10ft) long battery cable is used to connect reserve power batteries to the system power supply when the system has less than three cabinets. One reserve power cable is required for each cabinet in a one or two cabinet system (wall or floor mount). The cable connects the Strata CTX670 cabinet power supply directly to the battery terminals (a BBDB is not required).
BBDB	Strata CTX reserve power battery distribution box is required when connecting reserve power batteries to three or more cabinets (wall or floor mount). The box is field installed into one of the Strata CTX cabinet side panels. The BBDB provides seven BBTC2A-2.0M, battery distribution cables to connect reserve power from the BDDB box to each individual cabinet power supply. One or two BBTC1A-2.0M must be ordered separately when using the BBDB battery distribution box.
BBTC1A-2.0M	A two-meter (6.7ft) battery cable used to connect reserve power batteries to the BBDB battery distribution box. One reserve power cable is required in a three or four cabinet system and two cables are required for five, six or seven cabinet systems (wall or floor mount). The cable connects Strata CTX BBDB box directly to the battery terminals.
BFIF	Floor mount fixture kit is required when floor mounting Strata CTX cabinets. Provides two metal stands for mounting any number of Strata CTX cabinets on the floor. Three pairs or wall brackets (RWBF) are supplied with BFIF to use when mounting three or more Strata CTX cabinets on floor. The wall brackets are needed to secure floor-mounted systems to the wall for safety purposes.

Hardware Compatibility

PCB compatibility for the Strata CT, CTX100 and CTX670 systems is shown in Table 1-30.

Table 1-30 Hardware Compatibility

PCB	Sub-assembly	CTX100	CTX670	CT	DK40
CHSUB672F			X	X	
CHSUE672F			X	X	
BPSU672F			X	X	
BBDB1A			X	X	
RCTUB/C/D					
B1, B2, B3, B5	(CT Processors)			X	
RRCS-4/8/12				X	
BRCS-4/8/12				X	
K5RCU2A					X
KSTU3F					X
RKYS2/3/4				X	X
BVPU		X	X	X	X
PDKU/PDKUS		X	X	X	X
PEKU	EOCU			X[1]	X[1]
PEMU		X	X	X	X
PEPU		(ACTU) or (BIOU)	(BIOU)	X	X
PIOU, PIOUS	IMDU	(ACTU), (BIOU) or (BSIS)	(BECU) or (BIOU)	X	X
PSTU2		X1		X	X
PCOU2		X1		X	X
RATU				X	
RATI+WOC S/W		(BATI+PC+S/W)		X	
RATHC				X	
BATI via LAN+PC+S/W	BTCH1A	X	X		
RSIU	RSIS, RMDS	(BSIS) or (AMDS)	(BECU) or (BIOU)	X	
RSTU	R48S	X	X	X	X
RPCI+StrataLink		(BPCI+PC)		X	X
BPCI, USB+PC+S/W		X	X		
PACU		X	X	X	X
RPTU		X	X	X	X
RBSU2A	RBSS, R40S	X[7]	X[7]	X	X
RBSU1A	RBSS, R40S				
RRCU			X	X	
REMU		X	X	X	X
RCOU	RCOS	X	X	X	X[3]
RPTU1F		X	X	X	X[4]
RPTU2F		X[6]	X[6]	X	X[4]
TJF8		X	X	X	X
TJF24		X	X	X	X
TJF32				X	X
TJF96		X	X	X	X
TJF280		X	X	X	X
DDCB	Doorphone	X	X	X	X
MDFB	D/Phn Mic	X	X	X	X

Table 1-30 Hardware Compatibility (Cont.)

PCB	Sub-assembly	CTX100	CTX670	CT	DK40
BDKU	BDKS	X[5]	X[5]	X[2]	X[2]
BIOU		X	X		
ADKU		X			

1. Tiu recommendation is RCOU/RSTU/PDKU should be used to maintain EMC compatibility.
2. Functions as a PDKU can not fit BDKS to this unit.
3. Functions as a PCOU can not fit RCOS to this unit.
4. Support first 12 channels only.
5. BDKU can support a mixture of DKT2500/3000/3500 simultaneously on the same unit.
6. Supports Qsig & ISDN operation.
7. Firmware level must be 1M for CTX.

Keysets		CTX100	CTX670	CT	DK40
EKT6500, HDSS, HDCB				X	X
DKT2000/2500		X	X	X	X
DKT3000		X	X	X[1]	X[1]
DKT3500		X	X	X[2]	X[2]

1. Works in DKT2000 transmission mode.
2. With some restrictions (details from Technical).

Peripherals	Comments	CTX100	CTX670	CT	DK40
Stratagy Flash	R3.1	X	X	X	X
Stratagy DK	R3.1	X	X	X	X
Stratagy 12				X	X
Stratagy Flash	R3.4 or higher	X	X	X	X
Stratagy DK	R3.4 or higher	X	X	X	X
Stratagy ES		X	X	X	
Insight DK Lite				X	X
Insight DK				X[1]	X[1]
Insight DK plus				X[1]	X[1]
Sub Supervisor				X[1]	X[1]
Lan Wall-10 User		X	X	X	X
Lite-upg-DK				X	X
Lite-upg-plus				X	X
Insight DK-upg				X	X
V2-upg-V3				X	X
A15302	Shorkarn W/B	X	X	X	X
A16640	Shorkarn W/B	X	X	X	X
A15569	Shorkarn W/B	X	X	X	X
Insight DK for CTX	10 Agents max	X	X		
Insight DK for CTX	Agents upgrd	X	X		
2P-DIGIT-B				X	X
Pluro Routers		X	X	X	X
Viper Routers		X	X	X	X

Peripherals	Comments	CTX100	CTX670	CT	DK40
MCK Gtwy/Extnd		X[2]	X[2]	X	X
ADV-C-LOW-32	Oak Call Logging	X[3]	X[3]	X[3]	X[3]
ADV-C-LOW-100	Oak Call Logging	X[3]	X[3]	X[3]	X[3]
Mirra Voice Recorders		X[4]	X[4]	X[4]	X[4]

1. Current versions of Insight DK can be upgraded to work with CTX. There is a cost and this is arranged through Sension.
2. Current version can only be used for DKT2500 terminals. Awaiting new MCK software to support DKT3500 series.
3. All current versions of Advanced Classic Oak software can be upgraded to be compatible with CTX. Provided by Oak.
4. The recorders must have the following Version softwware.

PCB/Part	Description	DKT2000/2500	DKT3000	DKT3500
HHEU	Headset I/F	X	X	X
BHEU	Headset I/F		X	X
BVSU	Off-Hk Call Ance		X	X
BPCI	1st pty CTI-USB		X	X
BTSA	Tilt Stand		X	X
RPCI	1st pty CTI-V24	X		
DVSU	Off-Hook Call Announce	X		
DADM2520F	Add-On-Mdule	X		
DDSS2560F	DSS Console	X		
DADM3020	Add-On-Mdule		X	X
DDSS3060	DSS Console		X	X

Strata CTX100 Installation 2

This chapter explains how to install the Strata CTX100 system. It includes information on site requirements, wiring diagrams, and step-by-step instructions on how to install the unit(s), the ground wiring, AC power cabling, reserve power (battery backup) cabling, and PCB cabling.

Inspection

1. When the system is received, examine all packages carefully and note any visible damage. If any damage is found, do not open the packages. Contact the delivery carrier immediately and make the proper claims.
2. After unpacking (and before installing), check the system against the packing list and inspect all equipment for damage. If equipment is missing or damaged, contact your supplier immediately.
3. Be sure to retain original packaging materials for re-use when storing or transporting system hardware.

Packaging and Storage

CAUTION! When handling (installing, removing, examining) PCBs, do not touch the back (soldered) side or edge connector. Always hold the PCB by its edges.

➤ When packaging and storing the system, remove PCBs from the system cabinet (the power supply may remain installed in the cabinet for storage and shipment). PCBs should be packaged in their original antistatic bags for protection against electrostatic discharge. Be sure to package equipment in its original shipping containers.

Site Requirements

This section defines the installation site requirements necessary to ensure a proper operating environment for the CTX100. Also included are grounding requirements.

Input Power

The Base Cabinet or the Base and Expansion Cabinet together require an input power source of 240VAC, 60 Hz, 15 amps. Each cabinet plugs into an AC power outlet. Each cabinet requires 0.7 amps AC from the power source or 1.4 amps AC combined. The power supply cord for each cabinet is 1.38m (4.5ft.) long with a standard three-pin 240VAC plug.

For UK power considerations please refer to the chapter ‘Notes to Users’ at the end of this manual.

The AC outlet is recommended to be dedicated and unswitched, with a solid third-wire ground. (See "AC Power and Earthing Requirements" on Page 2-4.) This eliminates interference from branch circuit motor noise or the like, and to prevent accidental power-off. To avoid accidental power turn-off, Toshiba recommends that you do *not* use an On/Off wall switch on this dedicated AC circuit.

For the Strata CTX100, a reserve power source (two or four customer-supplied 12VDC batteries) may be connected to the system to serve as a power failure backup.

Cabinet Size and Weight

The wall that will support the CTX100 should be able to support 15.9kg (35 lbs.) The weight of each cabinet is shown in Table 1-1 on Page 1-2.

Clearance and Location

The minimum clearance requirements for the Strata CTX100 Base and Expansion cabinets are shown in Figure 2-1.

Consider the following conditions when selecting a location for the Cabinet(s):

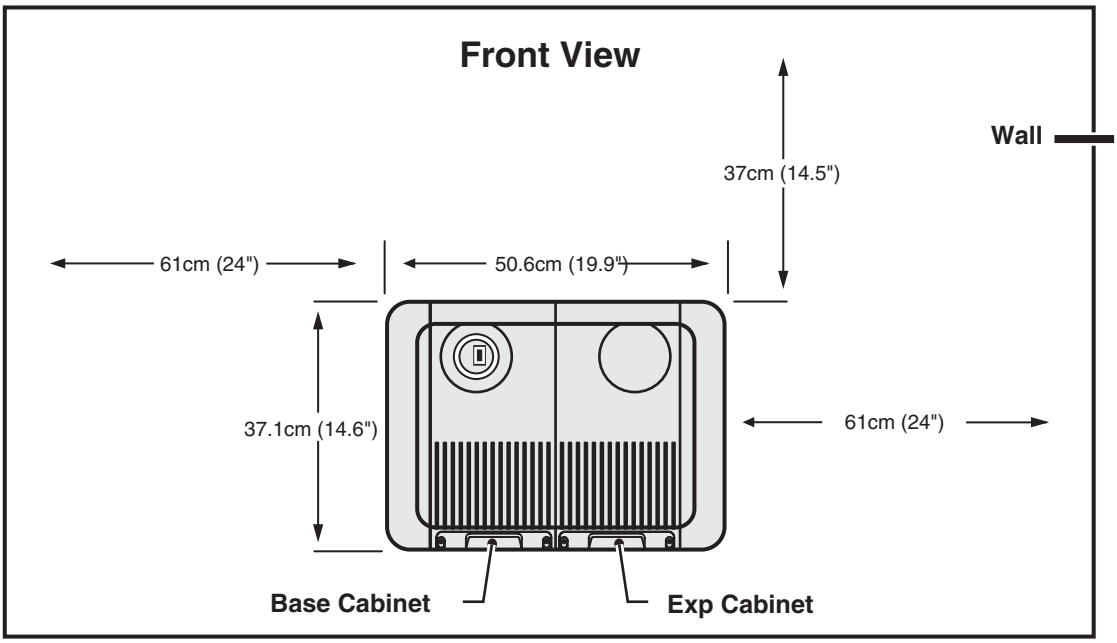
The location *must be*:

- Dry and clean
- Well ventilated
- Well illuminated
- Easily accessible

The location *must not be*:

- Subject to extreme heat or cold
- Subject to corrosive fumes, dust, or other airborne contaminants
- Subject to excessive vibration
- Next to television, radio, office automation, or high frequency equipment

If reserve power is to be installed for the Strata CTX100, the batteries will require a well-ventilated location close (within 2.74m or nine feet) to the CTX100 (the optional Toshiba-supplied battery cable is 2.74m/9ft in length).



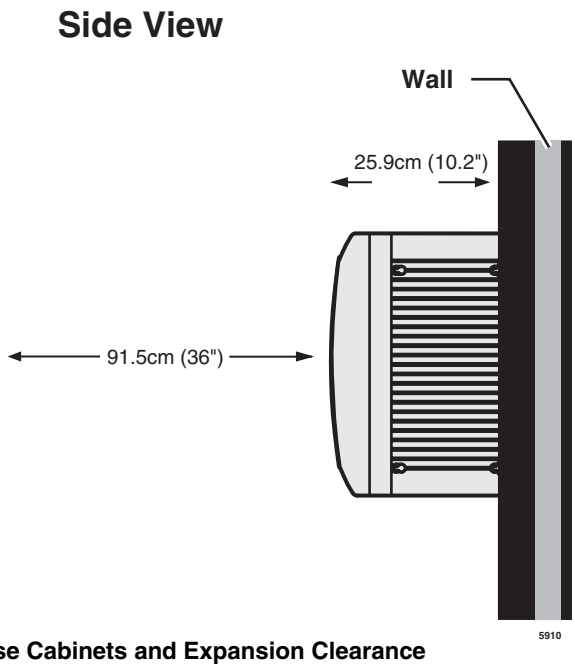


Figure 2-1 CTX100 Base Cabinets and Expansion Clearance

Environmental Considerations

Table 2-1 provides a summary of the environmental characteristics.

Table 2-1 CTX100 Environmental Characteristics

Environmental Specifications	
Operating temperature Operating humidity Storage temperature	32~104° F (0~40° C) 20~80% relative humidity without condensation -4~140° F (-20~60° C)
BTU Rating (Base plus Expansion Cabinet)	
ACTU (installed) BDKU (5 installed) RCOU/RCOS (1 installed) Digital Telephones (40 installed)	190 Watts (56 watt hours for both cabinets)

AC Power and Earthing Requirements

The CTX100 requires an earth connection back to the main distribution point for proper operation and safety. Failure to provide this earth may be a safety hazzard or lead to confusing fault, or operational symptoms and,in extreme cases, system failure. The AC power cord already contains a conductor for the “protective earth” provided by the commercial power outlet. This alone is not sufficient. It is also necessary to connect a seperate insulated conductor between the Frame Ground (FG) terminal on the base KSU and the main distribution point. (See Figure 2-2). This must be installed in accordance with the general rules for earthing contained in BS6701 parts 1 & 2.

Note Please note, no plug is fitted to the European version of CTX100 Product. Please refer to the chapter ‘Notes to Users’ at the end of this manual, which defines the power connection method.

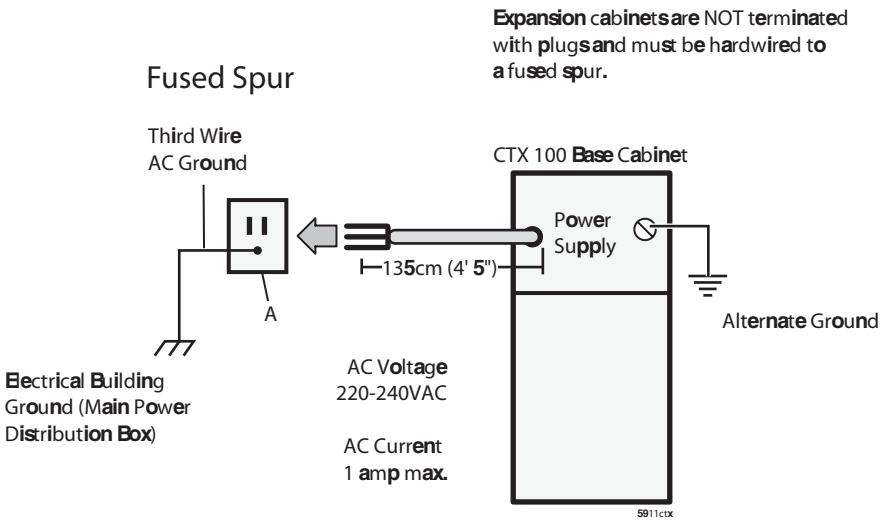


Figure 2-2 CTX100 Grounding Diagram

CAUTION! Lack of proper ground may cause improper operation and, in extreme cases, system failure.

An inter-cabinet ground wire connecting the Base and Expansion cabinets is not necessary.

AC Power and "PROTECTIVE EARTH" Test

Test the "protected earth" for continuity by measuring the resistance of the earth. This will test the earth connection and can be carried out by using a commercially available earth loop impedance meter. The result of the reading of this test must be less than one ohm.

WARNING! Hazardous voltages that may cause death or injury are exposed during the following test. Use great care when working with AC power line voltage.

CAUTION! If the reading is greater than one ohm, the system is not adequately earthed.

If the above test show the system to be inadequately earthed, the condition should be corrected by a qualified electrician before the system is connected

Installing the CTX100 Cabinet

Step 1: Remove Cabinet Covers

WARNING! Ensure the power supply AC plug is not plugged into the AC outlet.

1. Loosen the screws from the front cover to remove it.
2. Loosen the four screws from the top cover and slide it off.
3. Loosen the four screws from each side cover and pull the covers forward to remove them.

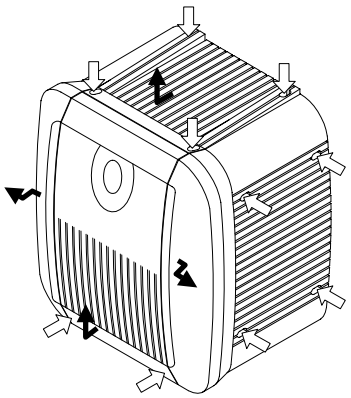


Figure 2-3 Cabinet Cover Removal

Step 2: Remove the Back Cover from the Cabinet(s)

1. Remove and save the two screws from the back of the Base Unit.
2. Slide the metal cover about 1.27cm (a half inch) to the right (it will drop down and forward) to remove it.
3. If you are installing an Expansion Cabinet, remove one screw from the back of the Expansion Cabinet. Slide the metal cover to the right to remove it.

Note The figure below show the position of the screws. Back covers should be removed before the Base and Expansion cabinets are attached to each other.

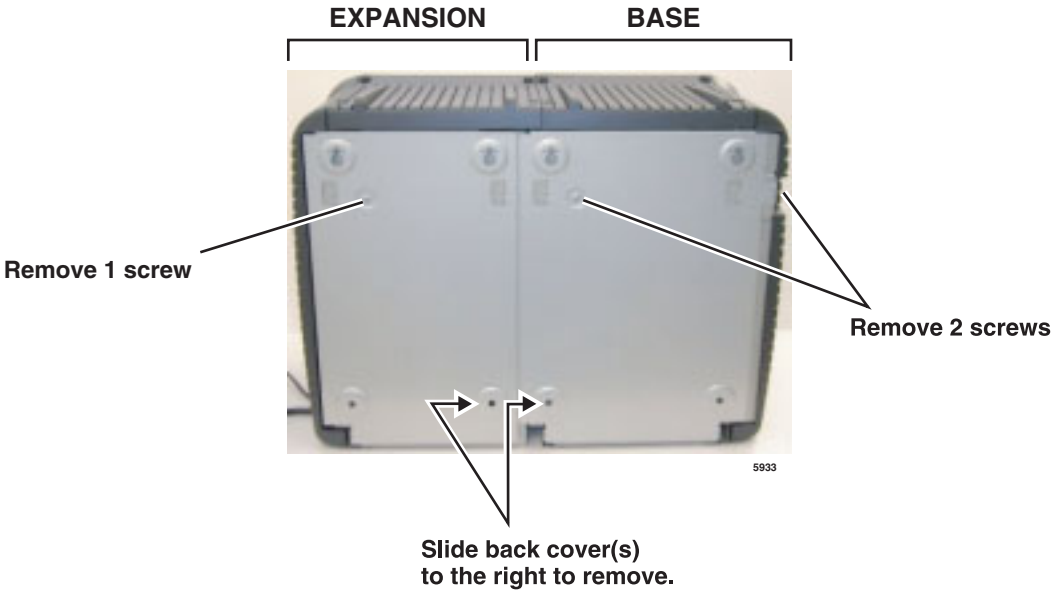


Figure 2-4 Base and Expansion Cabinet Back Covers

Step 3: Check the Base/Expansion Power Supply Jumper Plug

The APSU112F power supply is used in both CTX100 cabinets.

➤ Check that the "BASE/EXP." jumper plug is connected to the proper power supply connector as shown in Figure 2-14. The power supply has two connectors: one is labelled "BASE" and the other "EXP."

- If the power supply is mounted in the CTX100 Base Cabinet, the "BASE/EXP." jumper plug must be plugged into the "BASE" connector.
- If the power supply is mounted in the CTX100 Expansion cabinet, the jumper plug must be plugged into the "EXP." connector.

Step 4: Mount the Base Cabinet

WARNING! To prevent electrical shock, make sure the power supply is not plugged into the AC outlet.

1. Make sure the location of the Base Cabinet meets the minimum clearance requirements specified in Figure 2-1 on Page 2-3.

Note The Base Cabinet AC power cord is 1.37m (4ft 5") long.

2. Attach a 1.27cm (1/2") thick plywood back board to the wall where the CTX100 will be installed. Secure the back board to the wall with screws attached to the wall studs, shown in Figure 2-5.
3. Place the Base Cabinet back cover at the desired location on the back board using a level and mark the location of the four screw holes (there is one on each corner).
4. Drill holes on these marks.

5. Secure the top two screws approximately two thirds of the way into the top two holes on the back board.
6. Hang the Base Cabinet back cover from the top two screws and then secure the top and bottom screws completely into the back board. The base back cover should now be tightly secured to the back board. See Figure 2-5.
7. To mount the Base Cabinet, position the cabinet hanger holes onto back cover hangers (two on top and two on the bottom as shown in Figure 2-6). Slide the cabinet to the left.
8. Secure the Base Cabinet to the back cover with a screw through the left side bracket of the back cover to the Base Cabinet. (See Screw "A" in Figure 2-5.)
9. If you are installing an Expansion Cabinet, go to "Step 5: Mount the Expansion Cabinet (if required)" on Page 2-8. Follow the steps, then return to these steps.

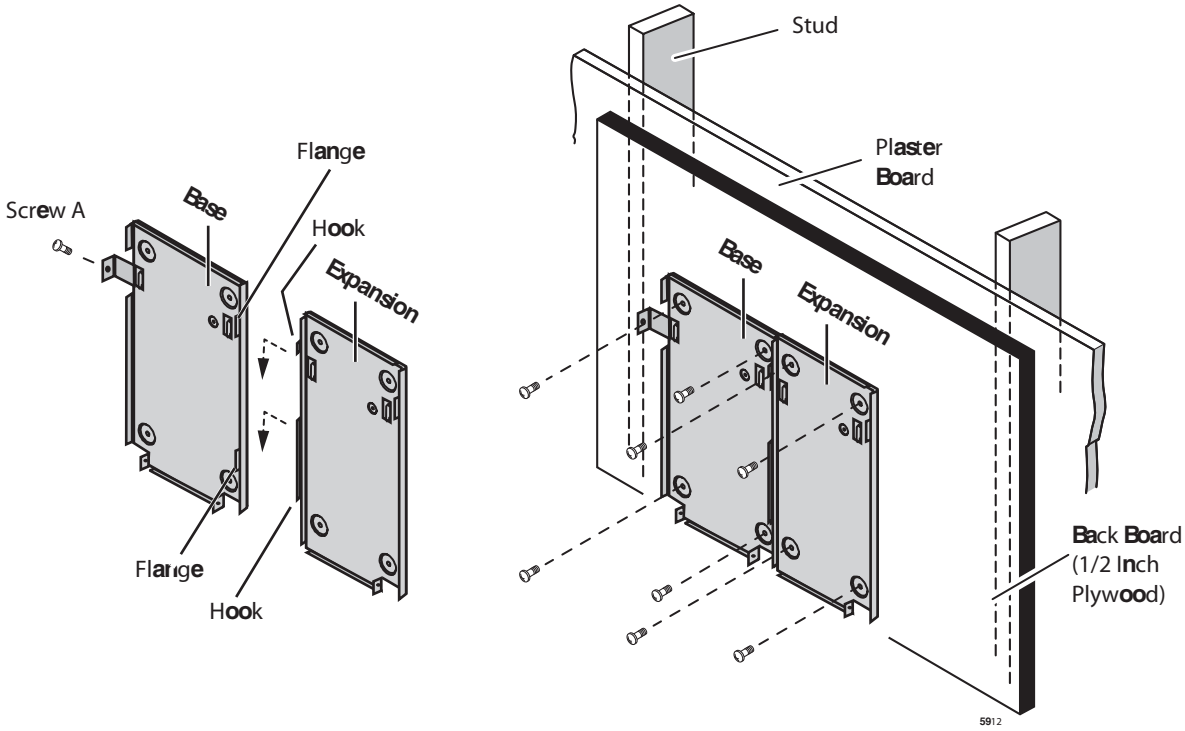


Figure 2-5 Cabinet Wall Mounting

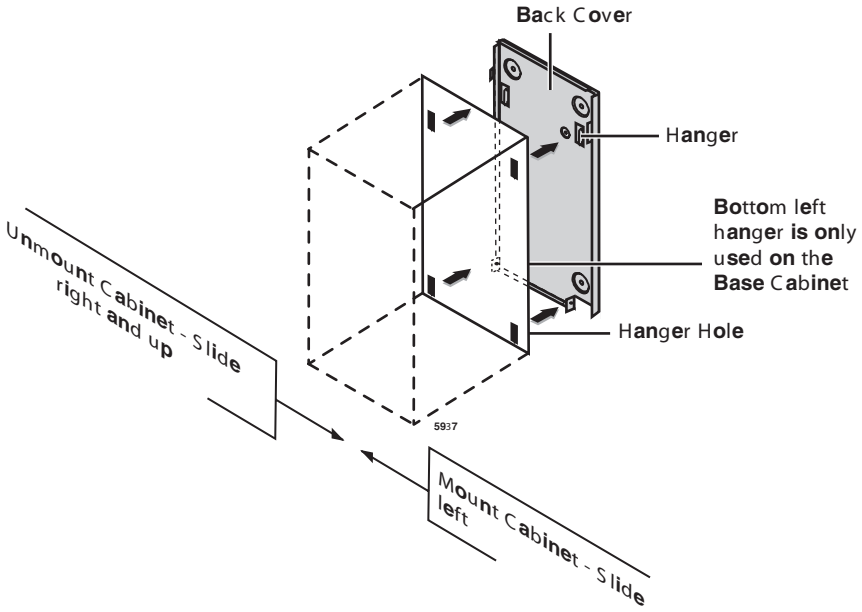


Figure 2-6 Mounting CTX100 Cabinet on Back Cover

10. Earth the system according to "AC Power and Earthing Requirements" on Page 2-4.
11. Go to "Step 8: Set Jumpers and Install Option PCBs onto the ACTU" on Page 2-17.

Step 5: Mount the Expansion Cabinet (if required)

WARNING! To prevent electrical shock, make sure the power supply is not plugged into the AC outlet.

1. Turn Base Cabinet DC power switch Off. Remove the four screws on the right side cover of the Base Cabinet.
1. Remove four screws from the right side of the Base Cabinet (since they will interfere with attaching the Expansion Cabinet to the Base Cabinet later).
2. Remove the Expansion Cabinet back cover from the Expansion Cabinet (see Figure 2-4).
3. Place the Expansion Cabinet back cover next to the Base Cabinet back cover, making sure expansion back cover hooks fit into the base back cover flanges (see Figure 2-5).
4. Mark the location of the four screw holes – there is one on each corner.

   Make sure the location of the Expansion Cabinet meets the minimum clearance requirements specified in Figure 2-1 on Page 2-3.
5. Drill holes on these marks.
6. Place the Expansion Cabinet back cover on the wall back board and secure the back cover to the back board with four screws.
7. On the right side of the AMAU motherboard inside the Base Cabinet, flip open the top and bottom locks for data ribbon cable plug. Plug in the data ribbon and close the locks. Feed the ribbon through the side hole of the Base Cabinet.

8. To mount the Expansion Cabinet, position it onto the back cover hangers.

Note Position the cabinet over the bottom right hanger first, and then carefully tilt the cover over the top two hangers.

9. Slide the Expansion Cabinet to the left, feeding the data ribbon cable through the side hole of the Expansion Cabinet.
10. Finish by securing the Expansion Cabinet to the Base cabinet with the two screws in front of the cabinets where they join together. The expansion cabinet left-side flange fits over the Base cabinet right side flange (see Figure 2-7).
11. On the AMAU motherboard of the Expansion Cabinet, flip open the two data ribbon locks, plug in the data ribbon and close the locks. The data ribbon cable should now be connected to the Base and Expansion cabinets.
12. Install PCBs into the Expansion Cabinet; follow the instructions in "Step 10: Install Other PCBs into the Cabinet(s)".

Note The Base Cabinet DC power switch will be the master control for turning the DC power of both cabinets On/Off.

13. Attach the outside covers on the Expansion Cabinet.

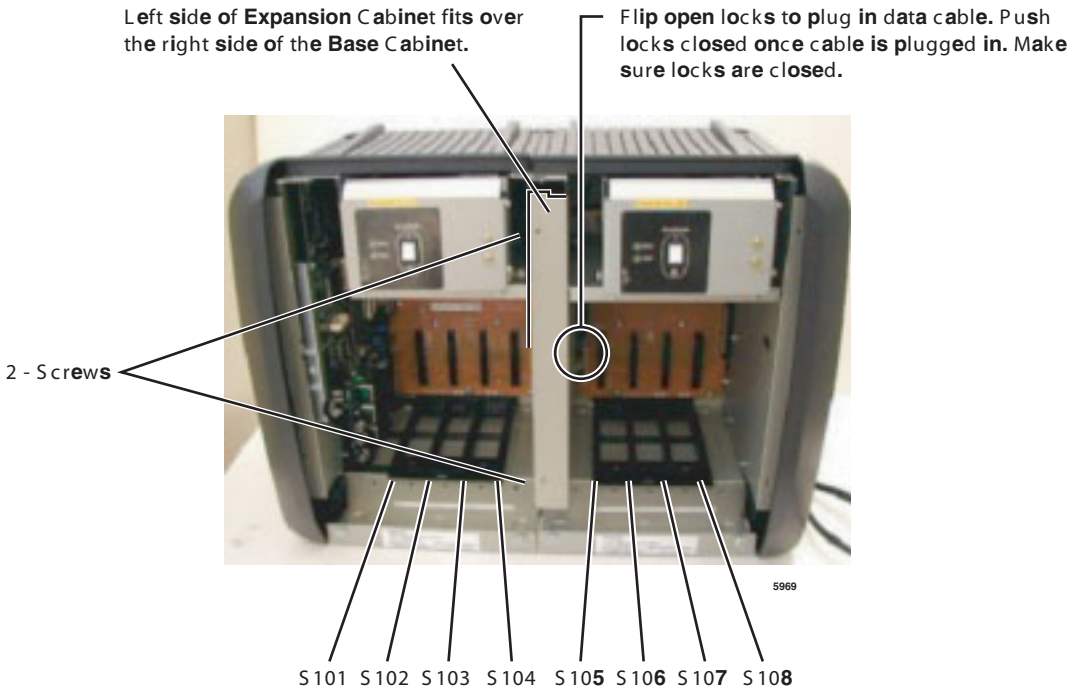


Figure 2-7 Base and Expansion Cabinet Interior

Step 6: Install Reserve Power

Skip this step if you are not going to install reserve power batteries.

A reserve power source (two or four customer supplied 12VDC batteries) can be connected to the CTX100 power supply equipped with an ABCS battery charger to ensure uninterrupted system operation in the event of a power failure. The ABCS battery charger and a pre-assembled battery cable (ABTC-3M) for connecting the batteries is available from Toshiba (see Figure 2-8).

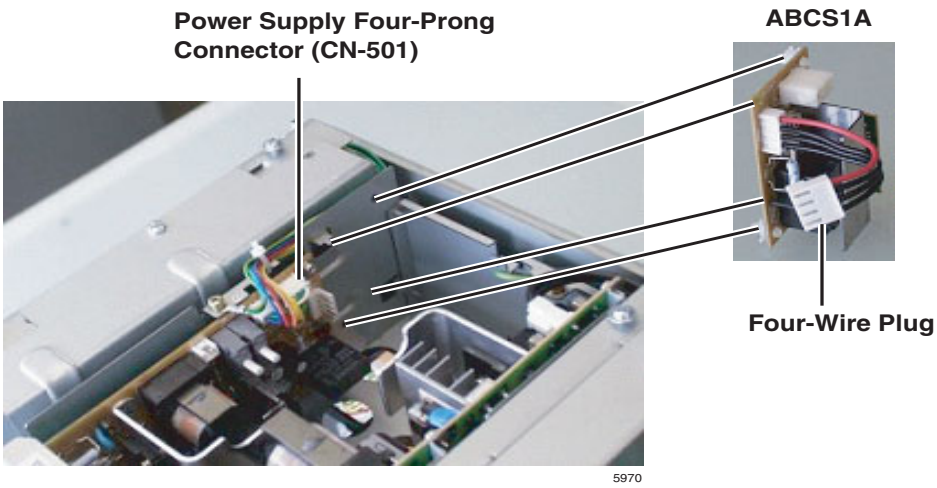


Figure 2-8 CTX100 Power Supply (Top view)

Reserve Battery Considerations

Important! *Local ordinances may dictate battery type and installation details.*

The batteries require a well-ventilated location within nine feet of the system (the interface cable is nine feet long).

WARNING! To reduce the risk of fire or injury to persons, read and follow these instructions:

- **Use only 12VDC gelcell batteries.**
- **Do not dispose of the batteries in a fire. The cells may explode. Check with local codes for possible special disposal instructions.**
- **Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.**
- **Exercise care in handling batteries in order not to short the battery with conduction materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.**
- **Charge the batteries provided with or identified for use with this product only in accordance with the instructions and limitations specified in this manual.**
- **Observe proper polarity orientation between the batteries and battery charger.**

Note Please note, the ABCS1A unit is fitted as standard in Base and Expansion cabinets on European versions of CTX100.

Step 6A: Install the Optional ABCS1A Battery Charger

WARNING! Whenever the cabinet top cover is removed, use extreme caution. Do not touch any internal power supply components because hazardous voltages may be exposed. Whenever adding/removing power supply components or checking circuit breakers and fuses, unplug the power supply AC plug from the AC source outlet.

1. Attach the ABCS1A to the inside wall of the Power Supply (see photos below). Fit the two holes on the ABCS1A over the metal prongs of the power supply and align the two plastic tips of the ABCS1A over the holes on the inside wall of the power supply. Snap the ABCS1A into place. Pull on the ABCS1A to make sure that it's securely installed.
2. Attach the ABCS1A four-wire plug onto the power supply four-prong connector (CN-501).

Step 6B: Install the Battery Cable

1. A black jumper wire is supplied with the ABTC-3M cable. Connect the black jumper wire from the positive terminal of one 12VDC battery to the negative terminal of the second 12VDC battery (see Figure 2-9).
2. Ensure that a serviceable 10-amp fuse is installed in the in-line fuse holder of the ABTC-3M battery cable.
3. Connect the white lead of the ABTC-3M battery cable to the open positive terminal of the 12VDC battery. Connect the black lead to the open negative terminal of the second 12VDC battery.

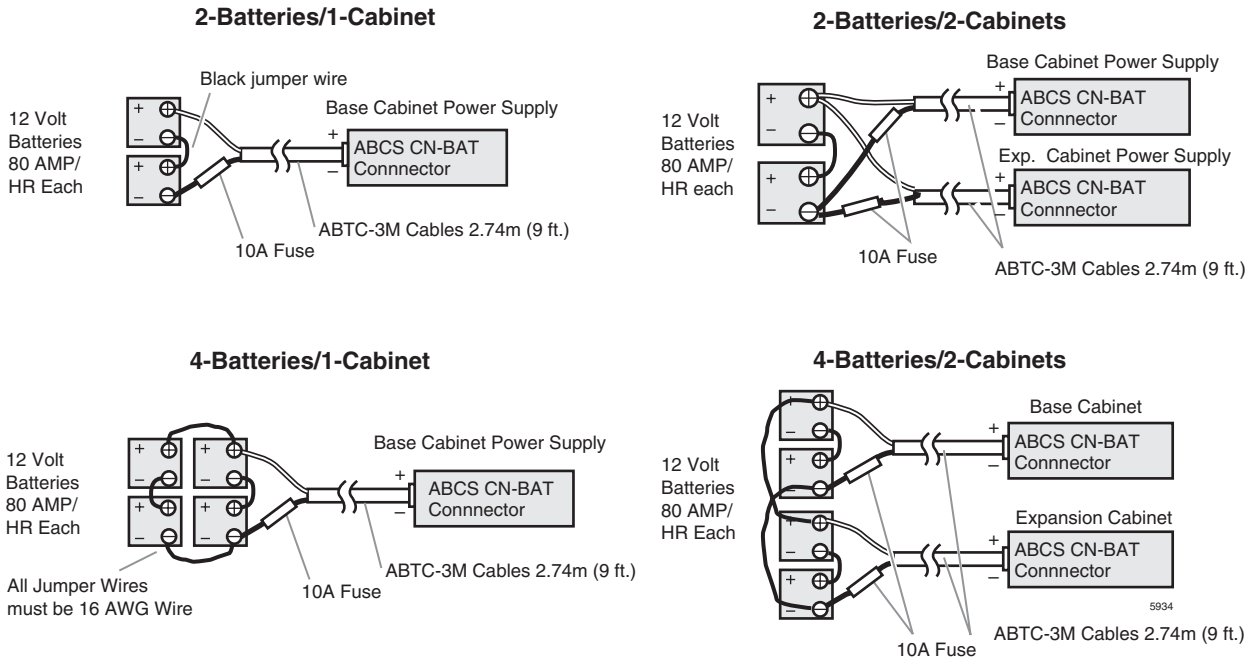


Figure 2-9 Battery Wiring Diagram

4. Run the ABTC-3M battery cable from the batteries to the ABCS battery charger located in the CTX100 power supply. Dress the battery cable within the CTX100 cabinet(s) carefully (see Figures 2-10~2-13).

Important! *The CTX100 must be connected to the live operating (hot) AC power source, and the power supply On/Off switch set to On prior to the final step of connecting the reserve power battery cable to the ABCS battery charger. If the batteries are connected after AC power is lost, reserve power will not function.*

5. Connect the ABTC-3M battery cable two-prong female plug to the power supply "CN-BAT" receptacle on the ABCS charger.
6. To test reserve power operation, disconnect the system AC power plug from the source outlet while the power supply power On/Off switch in the On position. The AC and DC power lights should be Off. The system should continue to operate without interruption or dropped calls.
7. Plug the AC power cable back into the outlet; make sure the power supply switch is On.
8. Confirm that the power supply is working properly. (AC Power lights should be On.)

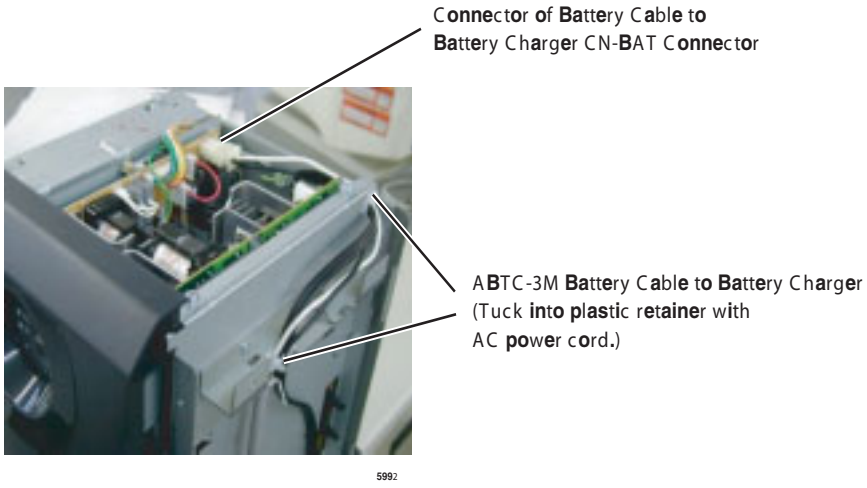


Figure 2-10 Cable Wiring for the Base and Expansion Cabinets (Top view)

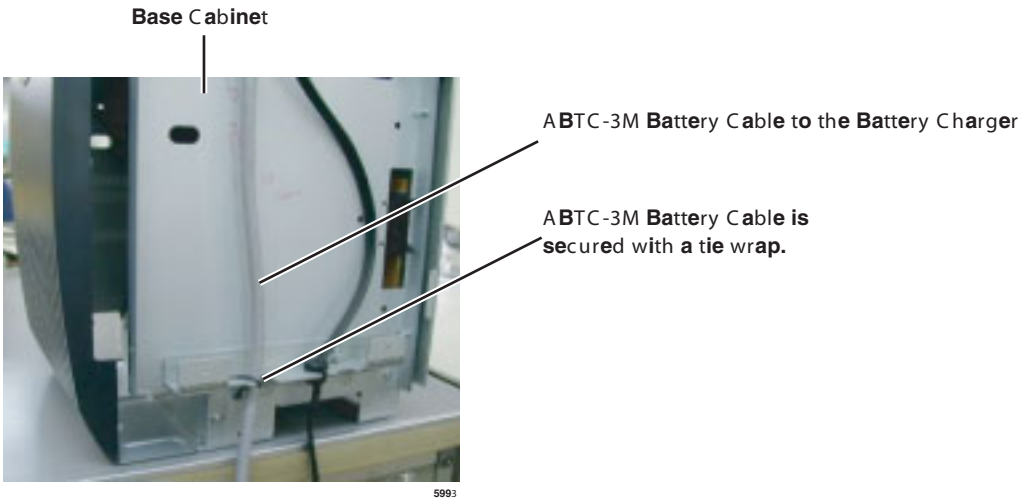


Figure 2-11 Cable Wiring for a Base Cabinet Only (Side view)

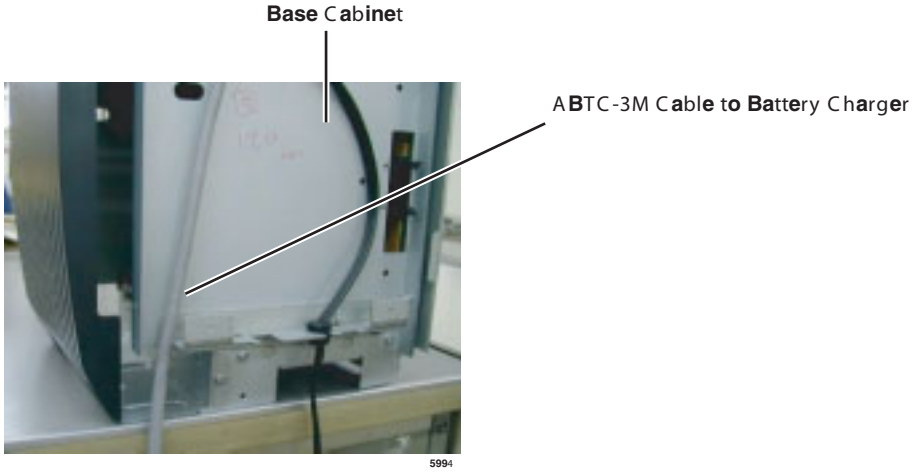


Figure 2-12 Cable Wiring for the Base with an Expansion Cabinet (Side view)

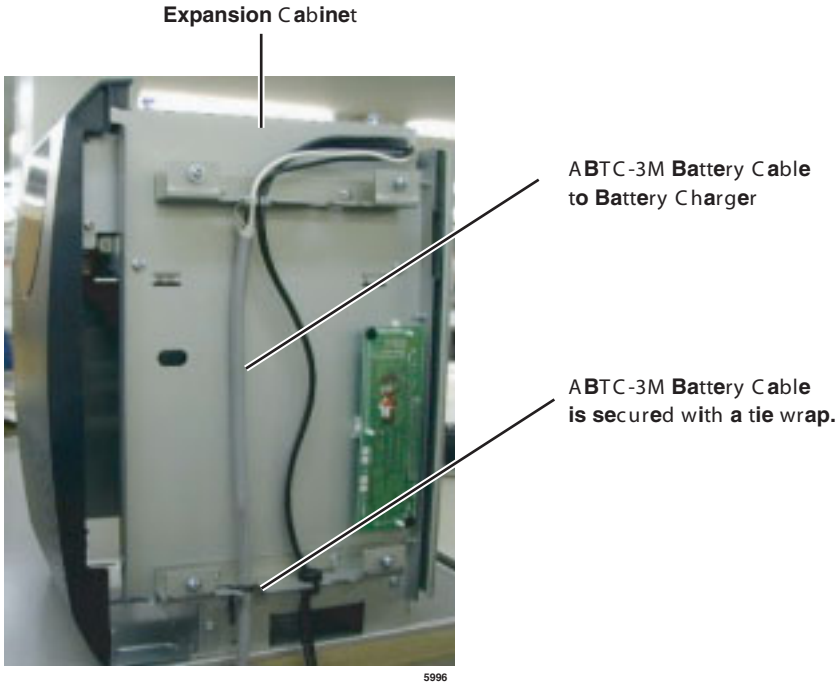


Figure 2-13 Cable Wiring for the Expansion Cabinet (Side view)

Step 7: Check Power Supply Circuit Breakers and Fuses

This step is only needed if you experience problems with the system.

WARNING! Whenever the cabinet top cover is removed, use extreme caution. Do not touch any internal power supply components because hazardous voltages may be exposed. Whenever adding/removing power supply components or checking circuit breakers and fuses, unplug the power supply AC plug from the AC source outlet.

Step 7A: Check the -24 Volt Circuit Breakers

The APSU112 provides two -24v circuit breakers as shown in Figure 2-14. If a low resistance between –24 volts and ground exists the circuit breaker will trip. Usually the front panel DC green LED indicator will turn off but not always. Also if AC power is recycled the DC LED indicator may turn back on – even if the –24 volt circuit breaker is tripped.

Circuit Breaker Location and Slot Assignments (see Figure 2-14)

- The circuit breaker V1, located directly below the FG screw, protects the first and second cabinet slots.
- The circuit breaker V2, located next to the BASE jumper connector, protects the third and fourth cabinet slots.

Reset Circuit Breaker

1. A defective PCB or an external short on the MDF may cause the circuit breaker to trip.
2. If you suspect that a –24 volt circuit breaker has tripped, try to reset it by:
   - Turn the power supply DC power switch off and unplug the power supply AC power cord from the AC outlet – the inside of the power supply has exposed voltages.
   - Gently press in each circuit breaker and listen for or try to feel it click. If the breaker was tripped, you will hear or feel it click back to the set position.
   - If the circuit breaker resets, pull the PCBs and check for MDF shorts associated with the slots assigned to the tripped circuit breaker. Remove any defective PCBs and MDF shorts.
   - Restore power and verify the system is working normally.
3. Replace the power supply if the circuit breaker continues to trip and a defective PCB or short cannot be found. See “Step 7D: Remove and Replace the Power Supply (if required)” on Page 2-15.

Step 7B: Check the AC Power Fuses

The APSU112 provides two AC power fuse as shown in Figure 2-14. If low resistance to ground exists the fuse may blow. The front panel AC green LED indicator will turn off.

If you suspect that a AC fuse has blown you may check it by:

1. Turn the power supply DC power switch off and unplug the power supply AC power cord from the AC outlet – the inside of the power supply has exposed voltages.
2. Remove each fuse and check that it is less than 0.3 ohms. Replace the fuse if it is defective. The fuse size is T6.3AH 250V.
3. If you replace the fuse and it continues to blow, pull the PCBs and check for cabinet shorts. Remove any defective PCBs and cabinet shorts.
4. Replace the power supply if the fuse continues to blow and a defective PCB or short cannot be found. See “Step 7D: Remove and Replace the Power Supply (if required)” on Page 2-15.

Step 7C: Check the Power Factor Indicator and Reset Button

The front panel of APSU112 provides a Power Factor LED and Reset button. If the cabinet power factor is exceeded by overload of PCBs, the PF LED will turn on.

- If the PF LED indicator turns on, press the PF reset button with a pointed tool or pencil. If the PF LED turns off and does not turn on again it may have been turned on by a current surge while installing a PCB while the power supply was turned-on.
- When a PF alarm is indicated, check that the cabinet power factor is not exceeded using "System Power Factor Check Considerations" on Page 1-27. If the Power factor has been exceeded relocate any PCBs that are causing the PF to be exceeded.

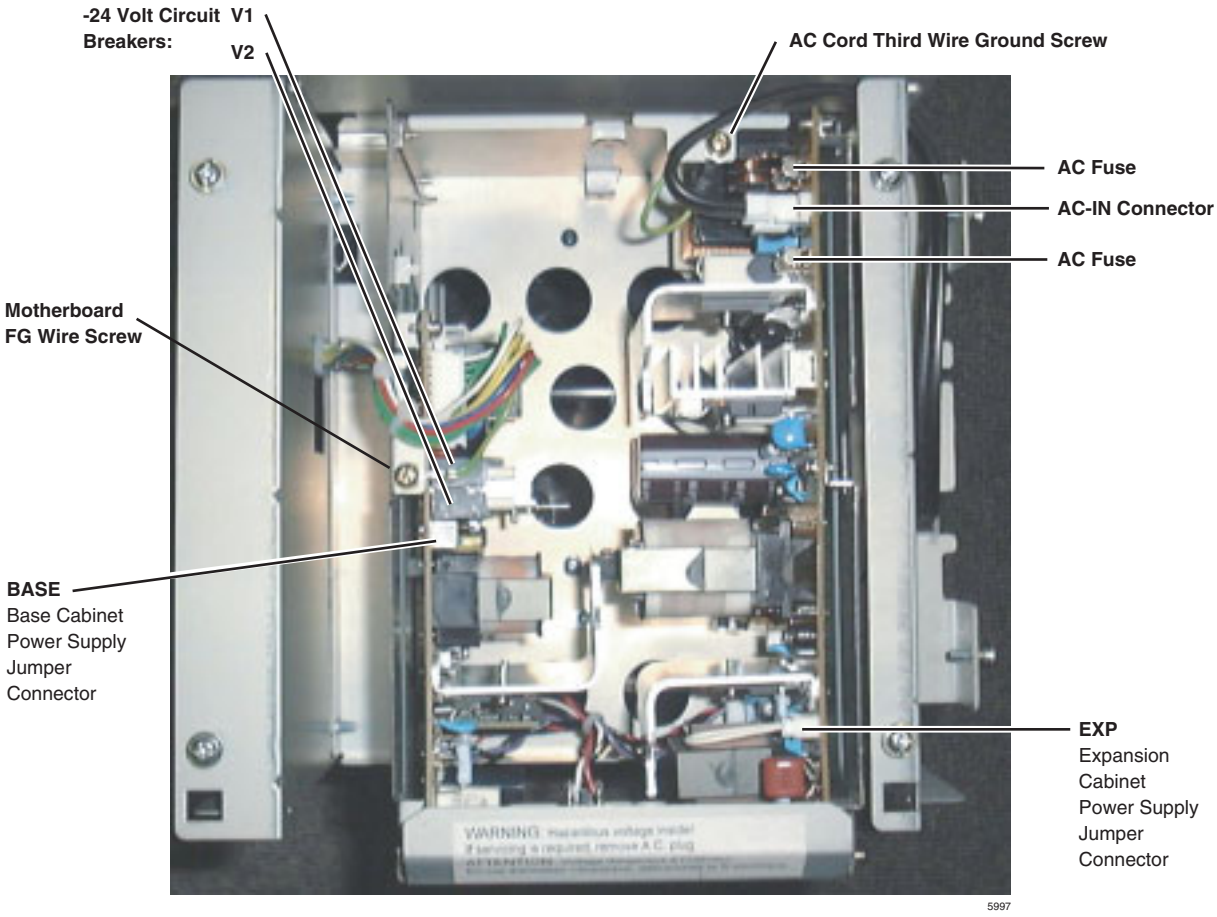


Figure 2-14 Power Supply Connectors Top View

Step 7D: Remove and Replace the Power Supply (if required)

The power supply (APSU112) comes factory-installed in the Base and Expansion Cabinets; if necessary, it can be removed and replaced. If you do not need to replace the power supply, skip this step.

Removing the Power Supply

WARNING! Whenever the cabinet top cover is removed, use extreme caution. Do not touch any internal power supply components because hazardous voltages may be exposed. Whenever adding/removing power supply components or checking circuit breakers and fuses, unplug the power supply AC plug from the AC source outlet.

1. Make sure that the power supply switch is Off and that the AC power cable is not plugged into an outlet. Confirm that the green AC LED is not lit (see Figure 2-15).
2. Remove the two screws in front of the Power Supply (see Figure 2-15).

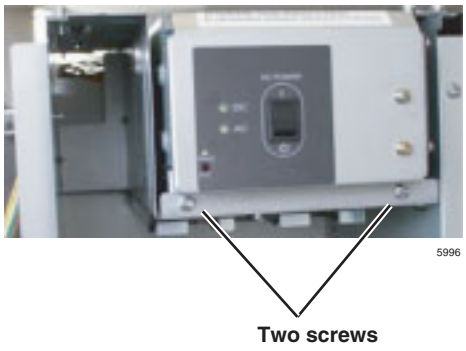


Figure 2-15 Power Supply (APSU112)

3. Unplug reserve battery cable from CN-BAT connector of power supply.
4. Unplug the DC cable from the “CN OUT” connector (P16) and cut the tie-wrap. Be careful not to cut any wires.
5. Remove the FG screw from left side of power supply to free FG wire/terminal and ground wire.
6. Remove the Power Supply from the Cabinet (see Figure 2-16).
7. If you are going to remove the ABCS battery charger, use pliers to unlock the plastic holders of the ABCS1A.
8. Unplug the AC power cord from the AC-IN connector.

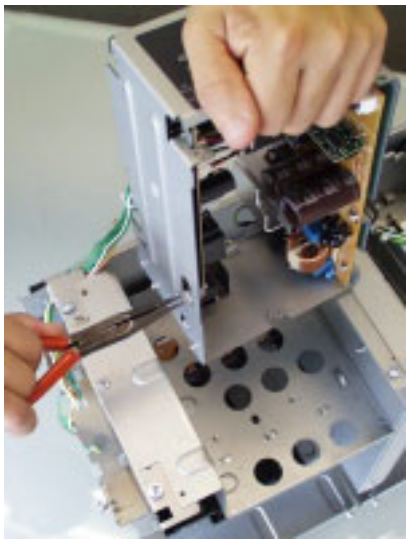


Figure 2-16 ABCS Power Supply Removal

Replacing the Power Supply

1. Make sure that the power supply switch is Off and that the AC power cable is not plugged into an outlet.
2. Set the power supply in its proper place in the cabinet (see Figure 2-16).
3. Secure the power supply to the cabinet with the screws.

4. Connect the green/green-yellow wire from the AMAU motherboard to the FG screw on the power supply.
5. Plug the DC cable into the CN OUT connector.
6. Install the ABCS battery charger.
7. Plug in the reserve battery cable to the CN-BAT connector of the ABCS battery charger.
8. Plug in the AC power cord connector into the AC-IN plug.
9. Insert and tight the two screws in front of the power supply (see Figure 2-15).
10. Plug the BASE/EXP jumper plug into the appropriate BASE or EXP connector on the power supply (see Figure 2-14).

Step 8: Set Jumpers and Install Option PCBs onto the ACTU

Refer to Figure 2-17 with the following steps.

1. On the ACTU PCB, set the battery jumper, “BATT,” to the “On” position.
2. On the ACTU, make sure the Mu/A jumper plug is set to the A position (U.K).
3. On the ACTU PCB, set the BBMS jumper “ATTACHED BBMS,” to the “NO” position.

Note If you are installing the AETS option PCB, before mounting the AETS, dress its green jumper wire under and behind the Ethernet port and out the top as shown in Figure 2-17. Remove the screw just above the AETS, place the jumper wire ring over the hole and replace the screw to hold the jumper wire ring in place.

4. Install needed option PCBs onto the ACTU (AETS, AMDS, BSIS, ARCS).
5. Position the option PCB in its respective area with the arrow pointing up.
6. Line up the option PCB connectors and plastic stand-offs with the connectors and stand-off holes on the ACTU and snap securely into place.
7. Insert the SmartMedia card (gold contacts face left, notched corner faces forward and up) into the SmartMedia slot on the ACTU.
8. Make sure that the power supply switch is Off.
9. Install the ACTU into the Base Cabinet (see following photos).

Note For more details about the jumpers and add-ons (subassemblies) for the ACTU, see Table 2-2 on Page 2-20.

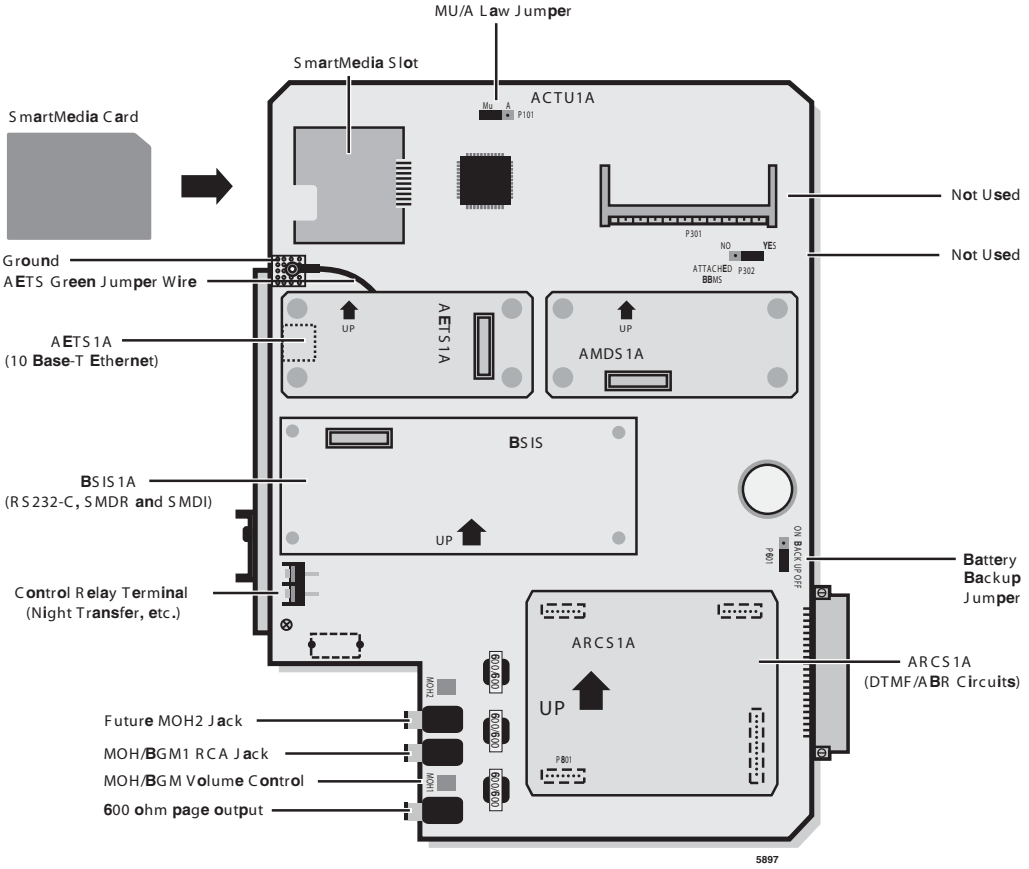


Figure 2-17 ACTU PCB (CTX100 Processor)

Step 9: Install the Main Processor (ACTU) PCB

The Strata CTX100 Base cabinet has one slot dedicated to the processor PCB. Slide the ACTU processor PCB into the first slot on the left side of the cabinet (as shown).

10. Loosen the screw slightly, then slide the processor lock upwards. Tighten the screw so that the PCB is locked into place.

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Step 10: Install Other PCBs into the Cabinet(s)

1. Each PCB must be configured for the applicable hardware options prior to installation of the PCB to the CTX100 cabinets.

   Configuration instructions for individual PCBs are in Chapter 4 – PCB Installation and Chapter 6 – MDF PCB Wiring. Configuration instructions for external hardware options are provided in Chapter 8 – Peripheral Installation.

2. Use the PCB placement guide in “Strata CTX100 Cabinet Slot Configuration Considerations” on Page 1-21 to determine which PCB slot can be used for each PCB type.

3. Slide the PCB Slot Locking Bar to the right, then insert each of the PCBs; push the PCBs firmly toward the motherboard, making sure that the connectors are secured (see Figure 2-18). Lightly tug on each PCB to make sure that it's installed securely.
4. After all the PCBs are installed, slide the PCB Slot Locking Bar to the left to lock the PCBs into place.
5. Configure the PCBs for software options through programming. Refer to the *Strata CTX Programming Manual* for more detailed programming instructions.

Note The Base and Expansion cabinets have four universal PCB slots each which can accept the same universal PCBs as the CTX670. CTX100-only components are shown in Table 2-2.

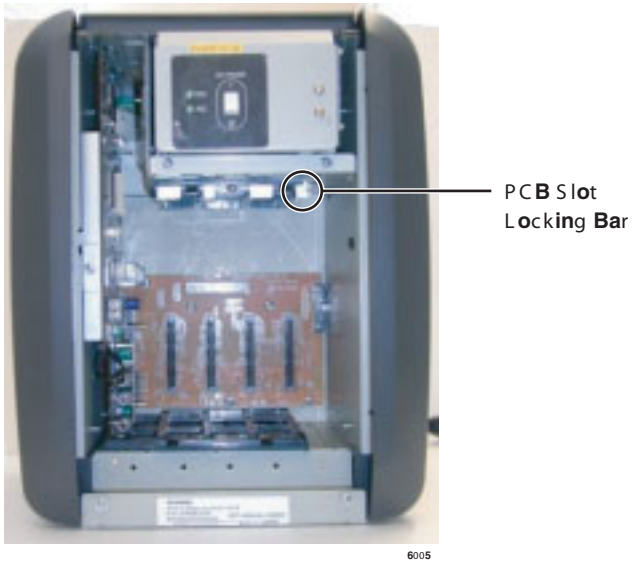


Figure 2-18 PCB Slot Locking Bar

Table 2-2 CTX100 Cabinet and Processor Components

PCB	Provides	Comments	Installs On
CHSUB112	Base Cabinet with power supply without battery charger.	Provides 4 universal slots.	
CHSUE112	Expansion Cabinet with power supply without battery charger.	Provides 4 universal slots.	
APSU112	Power Supply for CTX100.	Spare power supply.	Base or Expansion Cabinet
ACTU	System Processor PCB. (Optional PCB attachments include: modem. Ethernet 10BaseT, DTMF Receiver/Busy Tone Detector and Serial Interface Unit.	One per system. Supports 8 PCB slots (4 slots in the Base Cabinet + 4 more in the Expansion Cabinet).	
ARCS (Optional)	DTMF Receiver and ABR Circuits.	One per system. Provides 16 DTMF and 16 ABR circuits.	ACTU
AETS (Optional)	Ethernet LAN (10 BaseT)	One per system. Provides 10Mbps LAN by one RJ45 for WinAdmin.	ACTU
AMDS (Optional)	V.34 Modem	One per system to provide 33.6kbps maximum modem for WinAdmin.	ACTU
BSIS (Optional)	Serial interface unit (same unit used for CTX670).	Provides four RS-232 serial ports (SMDR, SMDI)	ACTU
ABCS (Optional) built-in	Battery Charger Circuit.	One per Power Supply for connection of Reserve Power (requires ABTC-3M Battery Cable). **Note** ABCS is built in on UK & European products.	APSU112A

Step 11: Attach and Route PCB Cables

1. Determine the direction that you want the cables to exit the cabinet(s) from the following:

   - **Single Direction Cable Routing** – Cabling from the Expansion Cabinet can run through the Base Cabinet and exit from the Base Cabinet (see Figure 2-19).

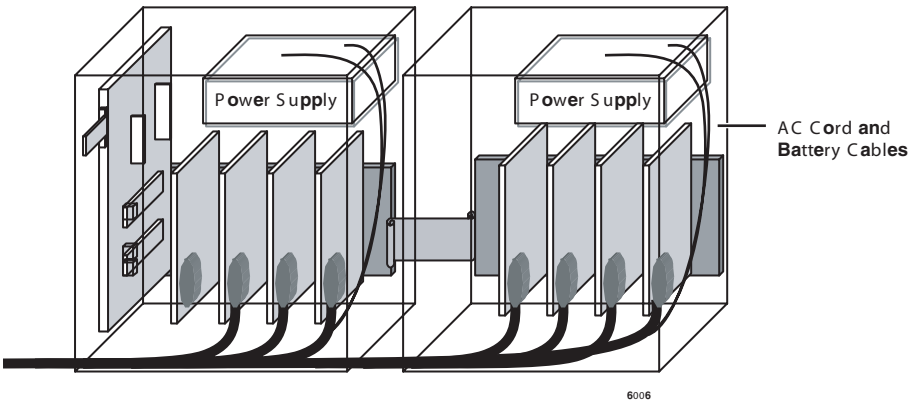


Figure 2-19 Single Direction Cable Routing

   - **Opposite Direction Cable Routing** – Cabling from the Expansion Cabinet can run through the right and left sides (see Figure 2-20).

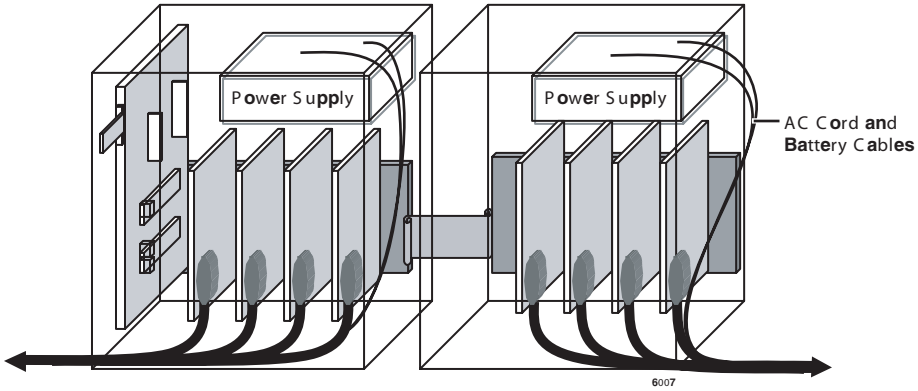


Figure 2-20 Opposite Direction Cable Routing

- **Do Not Run Cables Out the Top** – Cabling from either cabinet should be routed out the lower sides, not from the top of the cabinet(s) (see Figure 2-21).

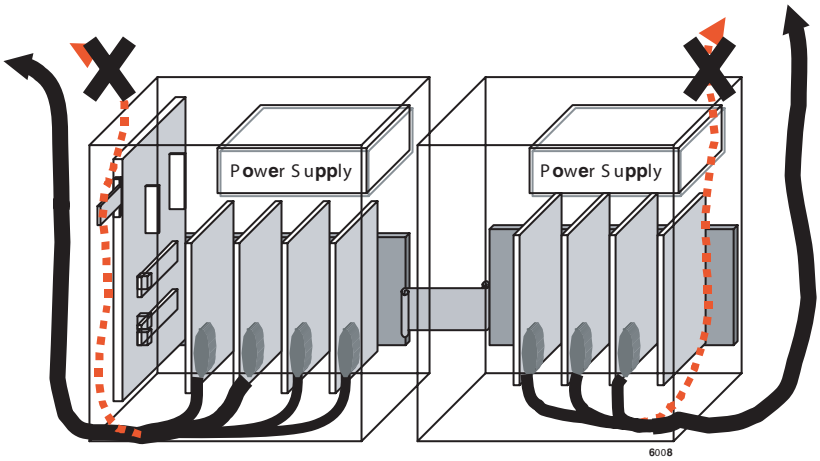


Figure 2-21 Avoid Improper Cable Routing

2. Remove the left or right cover(s) of the cabinet and knock out the rectangle(s) to create a hole for the cables, as needed (see Figure 2-22).

Note Cables can be run out of either side of Base or Expansion cabinets.

3. Connect applicable wiring (e.g., modular Exchange line cords, 25-pair amphenol connector cables) to the front of the PCBs as described earlier.

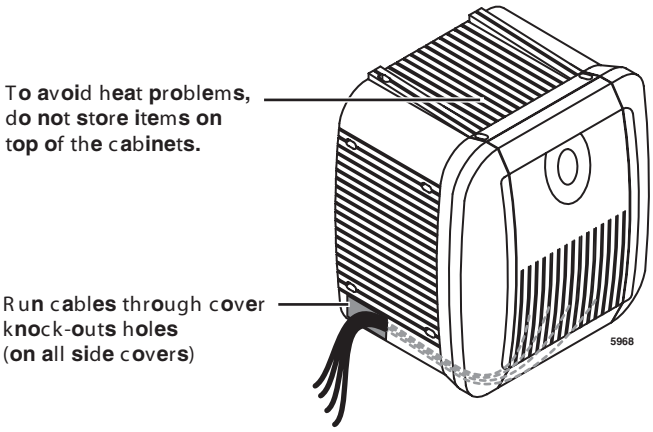


Figure 2-22 Base and Expansion Cabinet Cables and Connectors

4. Secure all Amphenol cables to the cabinets with tie wraps (see Figure 2-23).

Figure 2-23 Tie-wrap Cables

Strata CTX670 Installation 3

This chapter explains how to install the Strata CTX670 system. It includes information on site requirements and provides installation instructions for various cabinet configurations. It also explains how to install ground wiring, AC power cabling, reserve power (Battery Backup) cabling, and Printed Circuit Board (PCB) cabling.

Inspection

When the system is received, examine all packages carefully and note any visible damage. If any damage is found, do not open the packages. Contact the delivery carrier immediately and make the proper claims.

After unpacking (and before installing), check the system against the packing list and inspect all equipment for damage. If equipment is missing or damaged, contact your supplier immediately.

Be sure to retain original packaging materials for re-use when storing or transporting system hardware.

Packaging and Storage

CAUTION! When handling (installing, removing, examining) PCBs, do not touch the back (soldered) side or edge connector. Always hold the PCB by its edges.

When packaging and storing the system, remove PCBs from the system cabinet (the power supply may remain installed in the cabinet for storage and shipment). PCBs should be packaged in their original antistatic bags for protection against electrostatic discharge. Be sure to package equipment in its original shipping containers.

Site Requirements

Input Power

The CTX670 requires an input power source of 240±20VAC, 50/60 Hz, single phase. For up to five cabinets; 240VAC is required for six or seven cabinets. The system requires one or two AC outlets that must be dedicated to system use, fused, and grounded.

Each Remote Expansion Cabinet requires 3.2 amps. maximum. The remote cabinet installation requires one or two AC outlets that must be dedicated to system use, fused, and grounded.

See Cabinet Installation Considerations for complete AC power cabling, ground wiring and battery installation instructions for local and remote cabinets.

CAUTION! To avoid accidental power turn-off, do not use an On/Off wall switch for AC circuits dedicated for the use of CTX670.

A reserve power source (two or four customer-supplied 12VDC batteries) can be connected to the CTX670 to serve as a backup in case of power failure.

Separate reserve power may be required for remote expansion cabinets.

Clearance and Location

The Base and optional Expansion Cabinets can be either floor or wall mounted. Figure 3-1 shows the minimum clearance requirements for up to seven cabinets.

Notes

- Floor mounting requires the following additional hardware:
  - BFIF – floor mounting stands and brackets.
  - BCCB – electrical conduit box, if three or more cabinets are installed.
- Wall mounting requires a plywood (1.9cm or 3/4 inch thick) backboard.

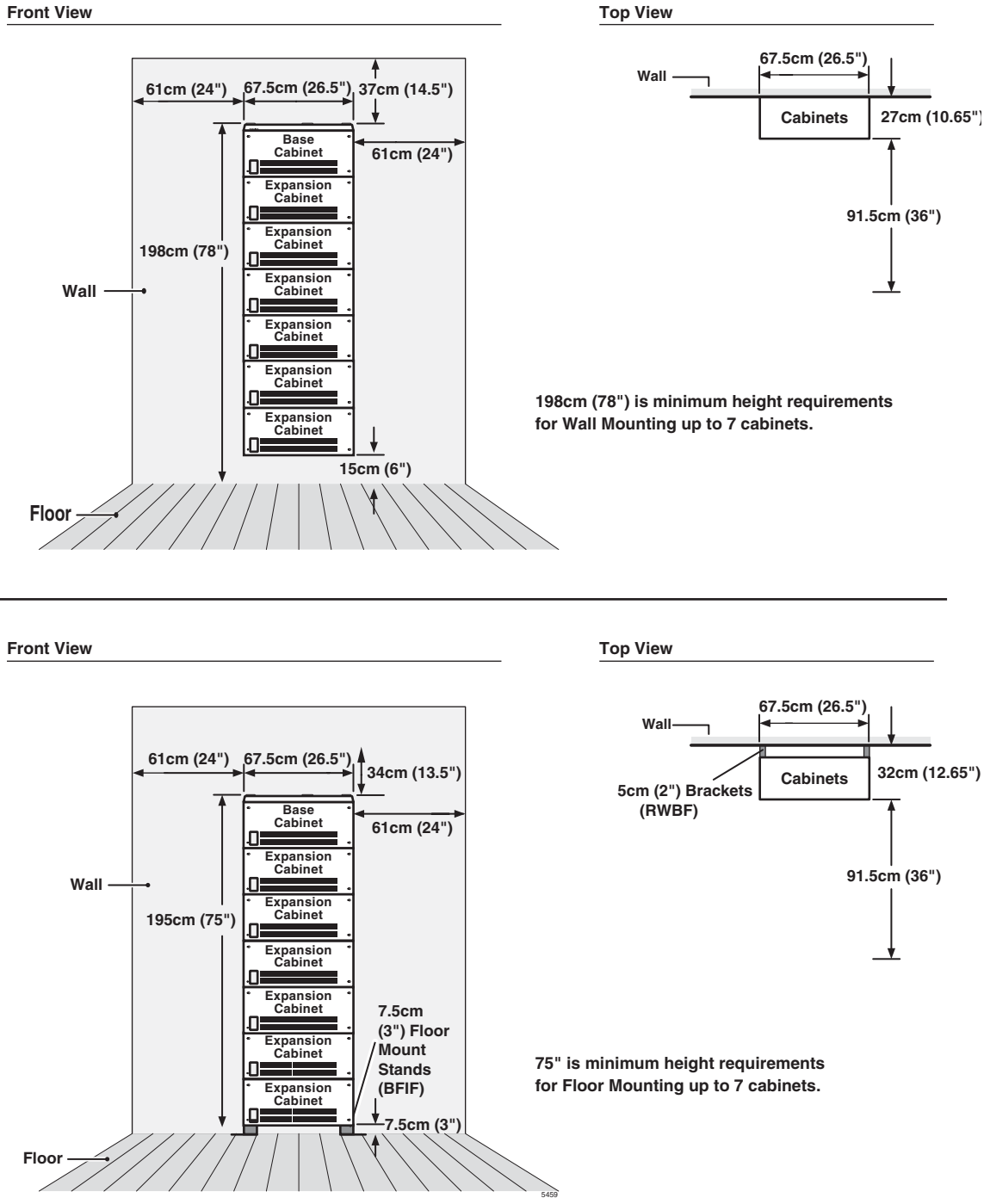
When selecting a location for the cabinets, the location *must be:*

- Dry and clean
- Well-ventilated
- Well-illuminated
- Easily accessible

The location *must not be*:

- Subject to extreme heat or cold
- Subject to corrosive fumes, dust, or other airborne contaminants
- Subject to excessive vibration
- Next to television, radio, office automation, or high frequency equipment

Optional customer-supplied reserve batteries require a well-ventilated location close (within 2.75m or 9 feet) to the CTX670 cabinets.



Note The Base Cabinet may be mounted at the bottom of the stack.

Figure 3-1 CTX670 Minimum Clearance Requirements

Power Considerations

Each CTX670 Base and Expansion Cabinet houses a power supply that furnishes power to all of the stations and some of the peripherals that interface with the cabinet (see Table 1-23, “Strata CTX670 Electrical Characteristics” on Page 1-31).

Reserve Power

Two or four customer-supplied 12VDC reserve batteries can be connected to the system to maintain normal operation during a power failure (see Table 1-26 on Page 1-33 and Table 1-23 on Page 1-31). The batteries are kept in a highly-charged state by the standard power supply and must be connected when the system is operating normally. Fully charged batteries must be connected when normal AC power is available, batteries cannot be connected after/during an actual power failure.

EU Registration Information

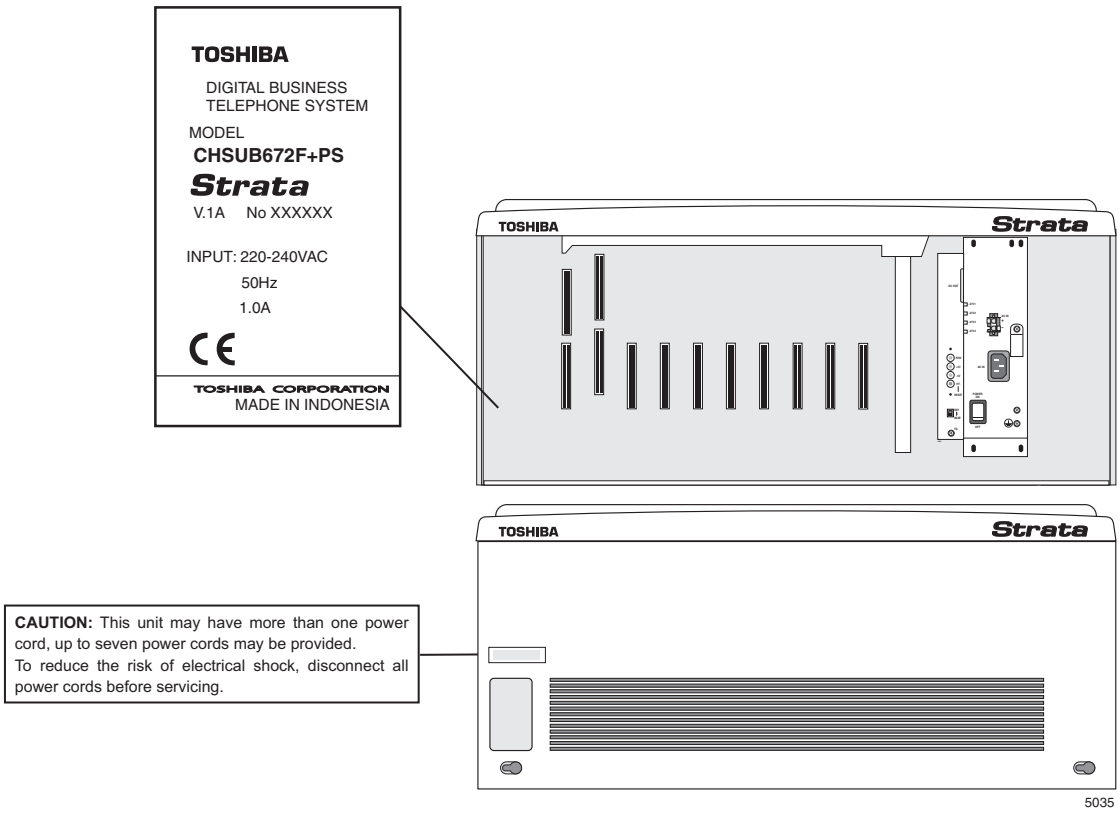


Figure 3-2 Location of Approval Labels

Cabinet Installation Considerations

The Base (CHSUB672) and Expansion (CHSUE672) Cabinets can be wall or floor mounted. To make it easier to add cabinets (after the initial installation) when a customer needs to expand, install the Base Cabinet on top for wall-mount installations and on the bottom for floor-mount installations.

The dimensions of the Base and Expansion Cabinets are:

Height: Base Cabinet: 29.8cm (11 3/4 inches)

Height: Expansion Cabinet/Remote Expansion Cabinet: 25.4cm (10 inches)

Width: 67.31cm (26 1/2 inches)

Depth: 27cm (10 5/8 inches)

Weight: approx. 13.8kg (30.5 lbs.)

Note The weight approximates a cabinet completely filled with PCBs. Weight may vary slightly, depending on PCBs.

Recommended Installation Sequence

Step	Reference Information
1. Install power supplies in cabinets.	"Install Power Supply" on Page 3-6.
2. Mount cabinets on wall or floor.	"Wall Mounting the Base (Top) Cabinet" on Page 3-10.
	"Cabinet Floor Mounting" on Page 3-27.
3. Install ground wiring.	"Ground the System" on Page 3-18.
4. Install AC power cabling to cabinets.	"Install AC Power Components" on Page 3-20.
5. Install reserve power cabling.	"Install Reserve Power" on Page 3-23.
6. Install PCBs and PCB cabling.	Figures 3-29~3-19, 3-33 and the section titled "Install Processor and Universal PCBs" on Page 3-35.

Note Each cabinet requires four wood screws (#12 X 2 inch size) for wall mount installation. Wood screws are not provided with the system.

Step 1: Install Power Supply

The Base and Expansion Cabinets are factory-shipped without the power supply installed. The CTX670 cabinets use the BPSU672 power supply, which is different from the DK280 or Strata CT.

➤ **To install power supplies in cabinets of new or installed systems**

1. Remove the power supply from its box. The power supply AC power cord for 230VAC and the power supply mounting screws are provided with the KSU cabinet.
2. Make sure that the front and right side covers are removed from the cabinet (see Figure 3-5**)**.
3. Slide the power supply into the right side of the cabinet so that its four mounting holes align with the four cabinet mounting holes. (Make sure that the two backplane FG wires are positioned between the FG wire holder and the power supply.)

Note The backplane FG wires are not safety grounds: they are required for proper system Exchange line operation.

4. Plug the Back Plane DC OUT cable plug into the DC OUT connector on the power supply. (The plug has a guide key on it to ensure that it is plugged in correctly.)
5. Secure the FG wire spade lug to the power supply with the FG screw.
6. Secure the power supply to the cabinet with the four provided screws.
7. If the cabinet is the Base Unit, a standalone Remote Expansion Cabinet, or the first in a stack of Remote Expansion Cabinets. Set the Exp/Base switch to the "Base" position (see Figure 3-3).
8. If the cabinet is an Expansion Unit, set the Exp/Base switch to the "Exp" position.

Important! *The power supply set as "Base" is the master and has On/Off control over all other power supplies, which are designated as slaves. If the master power supply is turned Off or On, all other power supplies will automatically turn Off or On. (Individual slave power supplies must be turned On.)*

9. See Figure 3-3 to ensure that the power supply is properly installed.
10. Install power supplies in all cabinets, using Steps 1~9 of this procedure.
11. Install the Base and optional Expansion Cabinets, ground wiring, and cabinet bonding plates, AC and reserve power cabling, and PCB cabling per the "Recommended Installation Sequence" on Page 3-6.

Check the -24 Volt Circuit Breakers

The BPSU672A provides four -24v circuit breakers as shown in Figure 3-3. If a low resistance between –24 volts and ground exists the circuit breaker will trip. Usually the front panel DC green LED indicator will turn off but not always. Also if AC power is recycled the DC LED indicator may turn back on – even if the –24 volt circuit breaker is tripped.

Circuit Breaker Location and Slot Assignments (see Figure 3-3)

- The circuit breaker 24V1~24V4, located directly below DC-out cable, protects the cabinet slots as shown in the Circuit Breaker assignment table.

Reset Circuit Breaker

1. A defective PCB or an external short on the MDF may cause the circuit breaker to trip.
2. If you suspect that a –24 volt circuit breaker has tripped, try to reset it by:
   - Turn the power supply DC power switch off and unplug the power supply AC power cord from the AC outlet – the inside of the power supply has exposed voltages.
   - Gently press in each circuit breaker and listen for or try to feel it click. If the breaker was tripped, you will hear or feel it click back to the set position.
   - If the circuit breaker resets, pull the PCBs and check for MDF shorts associated with the slots assigned to the tripped circuit breaker. Remove any defective PCBs and MDF shorts.
   - Restore power and verify the system is working normally.
3. Replace the power supply if the circuit breaker continues to trip and a defective PCB or short cannot be found.

Check the Power Factor Indicator and Reset Button

The front panel of BPSU672A provides a Power Factor LED and Reset button. If the cabinet power factor is exceeded by overload of PCBs, the PF LED will turn on.

➤ If the PF LED indicator turns on, press the PF reset button with a pointed tool or pencil. If the PF LED turns off and does not turn on again it may have been turned on by a current surge while installing a PCB while the power supply was turned-on.

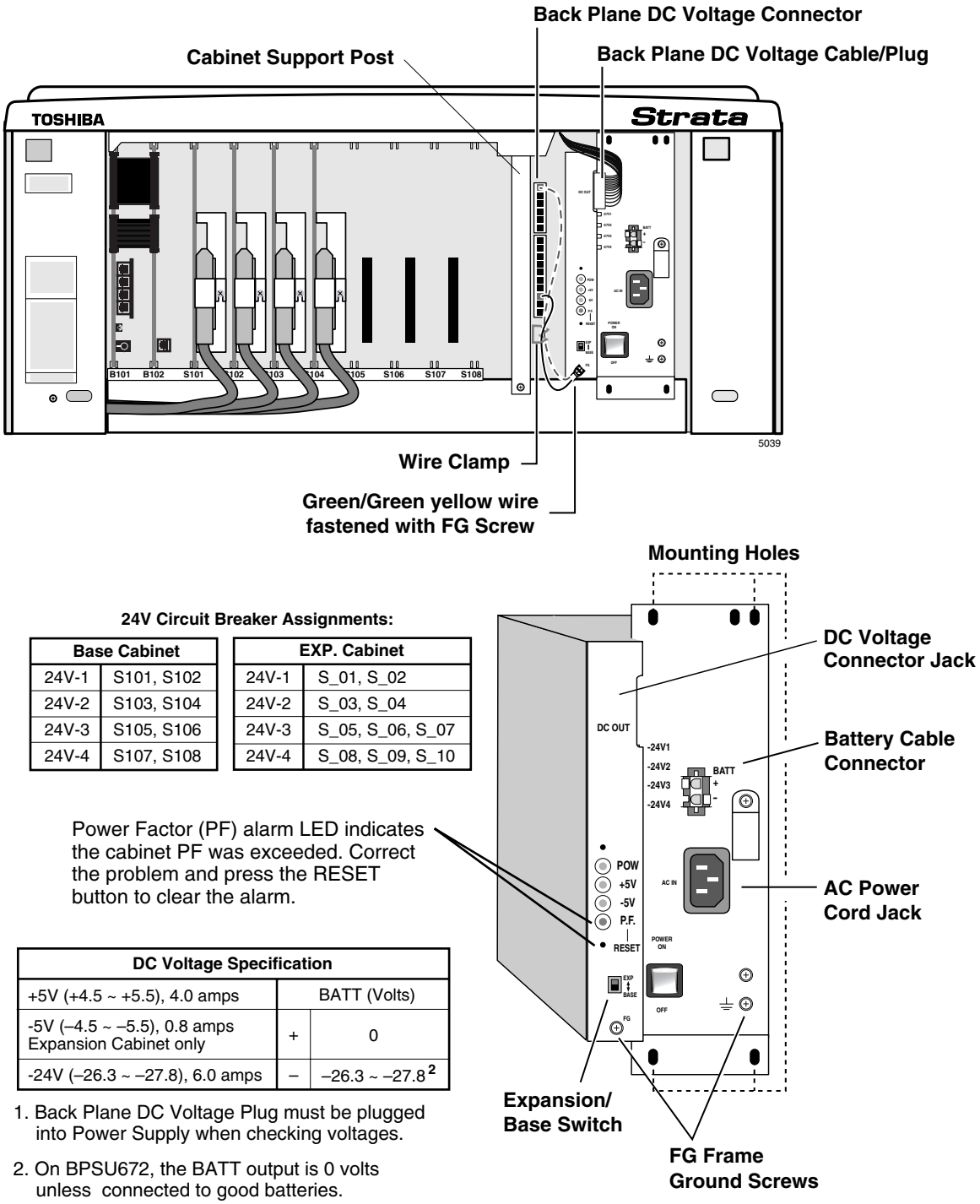
➤ When a PF alarm is indicated, check that the cabinet power factor is not exceeded using the "System Power Factor Check Considerations" on Page 1-27. If the Power factor has been exceeded relocate any PCBs that are causing the PF to be exceeded.

Power Supply (BPSU672) Removal

1. Remove the front and right side covers (Figure 3-5) from the cabinet. Remove the right side covers of other cabinets as needed to disconnect wiring.
2. Turn the power supply Off, and disconnect the AC power cord, all ground wiring and reserve power cabling that is connected to the power supply.
3. Disconnect the back plane DC OUT cable plug from the DC OUT connector.
4. Loosen the four mounting screws securing the power supply to the cabinet and remove the power supply.

Power Supply Replacement

➤ Install the replacement power supply per "Install Power Supply" on Page 3-6.



24V Circuit Breaker Assignments:

Base Cabinet	
24V-1	S101, S102
24V-2	S103, S104
24V-3	S105, S106
24V-4	S107, S108

EXP. Cabinet	
24V-1	S_01, S_02
24V-2	S_03, S_04
24V-3	S_05, S_06, S_07
24V-4	S_08, S_09, S_10

Power Factor (PF) alarm LED indicates the cabinet PF was exceeded. Correct the problem and press the RESET button to clear the alarm.

DC Voltage Specification		
+5V (+4.5 ~ +5.5), 4.0 amps	BATT (Volts)	
-5V (–4.5 ~ –5.5), 0.8 amps Expansion Cabinet only	+	0
-24V (–26.3 ~ –27.8), 6.0 amps	–	–26.3 ~ –27.8 [2]

1. Back Plane DC Voltage Plug must be plugged into Power Supply when checking voltages.
2. On BPSU672, the BATT output is 0 volts unless connected to good batteries.

DC Voltage Connector Plug Pin Wires						
Yellow	**Blue**	**White**	**Green**	**Green**	**Green**	**Red**
-24	-5	+5	0	0	0	+5
Yellow	**Yellow**	**Yellow**	**Green**	**Green**	**Green**	**Red**
-24	-24	-24	0	0	0	+5

Figure 3-3 Power Supply Installation

Step 2: Mount Cabinets

There are two methods of mounting cabinets: wall or floor mounting. Wall mounting the most common and economical method is described below. The floor mounting description begins on Page 3-27.

Note Toshiba recommends installing cabinets (see Figures 3-4~3-10) from the top down, Base Cabinet on top, first Expansion Cabinet below it, second cabinet below that, etc.

Wall Mounting the Base (Top) Cabinet

Follow these instructions to wall mount the Base Cabinet or the first Remote Expansion Cabinet. A wooden backboard between the cabinet and the wall is necessary (see Figure 3-4).

1. Obtain a board, such as plywood, that is at least 1.9cm (3/4") thick. The board should be at least 1.98m (6.5 feet) high (completely expanded systems with seven cabinets require this much height) and 66cm (26") wide (minimum).

   Secure the board to the wall with wood screws with the bottom edge of the board is 15.2cm (6") above the floor. (If there are wall studs, make sure the screws align with the studs.)

2. Remove the front, back, and side covers from the Base Cabinet or first Remote Expansion Cabinet (see Figure 3-5).

Note The two screws on the front cover and the two screws on each side cover should be loosened just enough to slide the covers off. The front cover slides left and the side covers swing out and down for removal.

3. Hold the Base Cabinet back cover against the wall or backboard so that its two top mounting holes are approximately 1.98m (6.5 feet or 78 inches) above the floor. This allows up to seven cabinets to be installed (top-down) with a 15.2cm (six-inch) clearance between the floor and bottom cabinet (see Figures 3-6 and 3-7).
4. Use a level to make sure that the back cover is held level.
5. Trace the upper arch of the top mounting holes with a pencil.
6. Remove the back cover from the wall. Draw a line between the top two marking hole marks.
7. Drill holes on the line in the middle of the arch tracing.
8. Screw #12 X 2 inch size wood screws into the two drilled holes, leaving about 32mm (1/8 of an inch) clearance between the screw heads and the wall.
9. Hang the Base Cabinet or first Remote Expansion Cabinet back cover from the top two screws and secure the screws into the wall.
10. Drill holes at the bottom two mounting holes of the back cover, and secure #12 X 2 inch wood screws into the two holes.
11. If installing a Base Cabinet or first Remote Expansion Cabinet back cover to the wall: Position the cabinet on the back cover cabinet hangers, slide the cabinet right to the proper mounting position, and secure the cabinet to the back cover with two screws on the right side of the cabinet. If installing Expansion Cabinets, skip to "Wall Mounting Expansion Cabinets" on Page 3-11.
12. Install ground wiring, AC and reserve power cabling, and PCB cabling per the "Recommended Installation Sequence" on Page 3-6.
13. Fill out the slot identification label on the cabinet (see Figure 3-8).

14. Reinstall the front cover, top cover, and side covers onto the cabinet.

Wall Mounting Expansion Cabinets

1. Remove the front, back, and side covers from the Expansion Cabinets.

Note The two screws on the front cover and the two screws on each side cover should be loosened just enough to slide the covers off. The front cover slides left and the side covers swing out and down for removal.

2. Hold an Expansion Cabinet back cover against the wall so that its top locating parts align with the bottom locating parts of the Base Cabinet back cover (see Figure 3-4 on Page 3-12). To secure the Expansion Cabinet back cover to the back board, repeat Steps 5~11 from "Wall Mounting the Base (Top) Cabinet" on Page 3-10.
3. To install additional Expansion Cabinet back covers, repeat Step 2 above.
4. Starting with the top Expansion Cabinet back cover (which is fastened to the wall), position an Expansion Cabinet on the back cover cabinet hangers. Slide the cabinet to the right to the proper mounting position, and secure the cabinet to the back cover with two screws to the right side of the back cover. Repeat for all other Expansion Cabinets.
5. Loosen the bonding connection plates fastened on both sides of the first Expansion Cabinet (see Figure 3-9) then fasten the plates between the Base Cabinet and the first Expansion Cabinet. Repeat to connect the first Expansion Cabinet to the second Expansion Cabinet, etc.
6. Base Cabinet: Loosen data cable door locking screws and open data cable doors; then connect the first Expansion Cabinet data cable to the "CAB 2" (top) data cable connector on the Base Cabinet. Install data cables in appropriate connectors for all other Expansion Cabinets.
7. After all data cables are installed, close data cable doors and secure with the locking screw.

Important! *Data cable door screws must be firmly tightened for proper system operation. Data cables for DK280 and Strata CT cabinets are not compatible with CTX670 cabinets.*

8. Install ground wiring, AC and reserve power cabling, and PCB cabling per the "Recommended Installation Sequence" on Page 3-6.
9. Fill out cabinet/slot identification labels on each cabinet.
10. Reinstall covers onto cabinets.

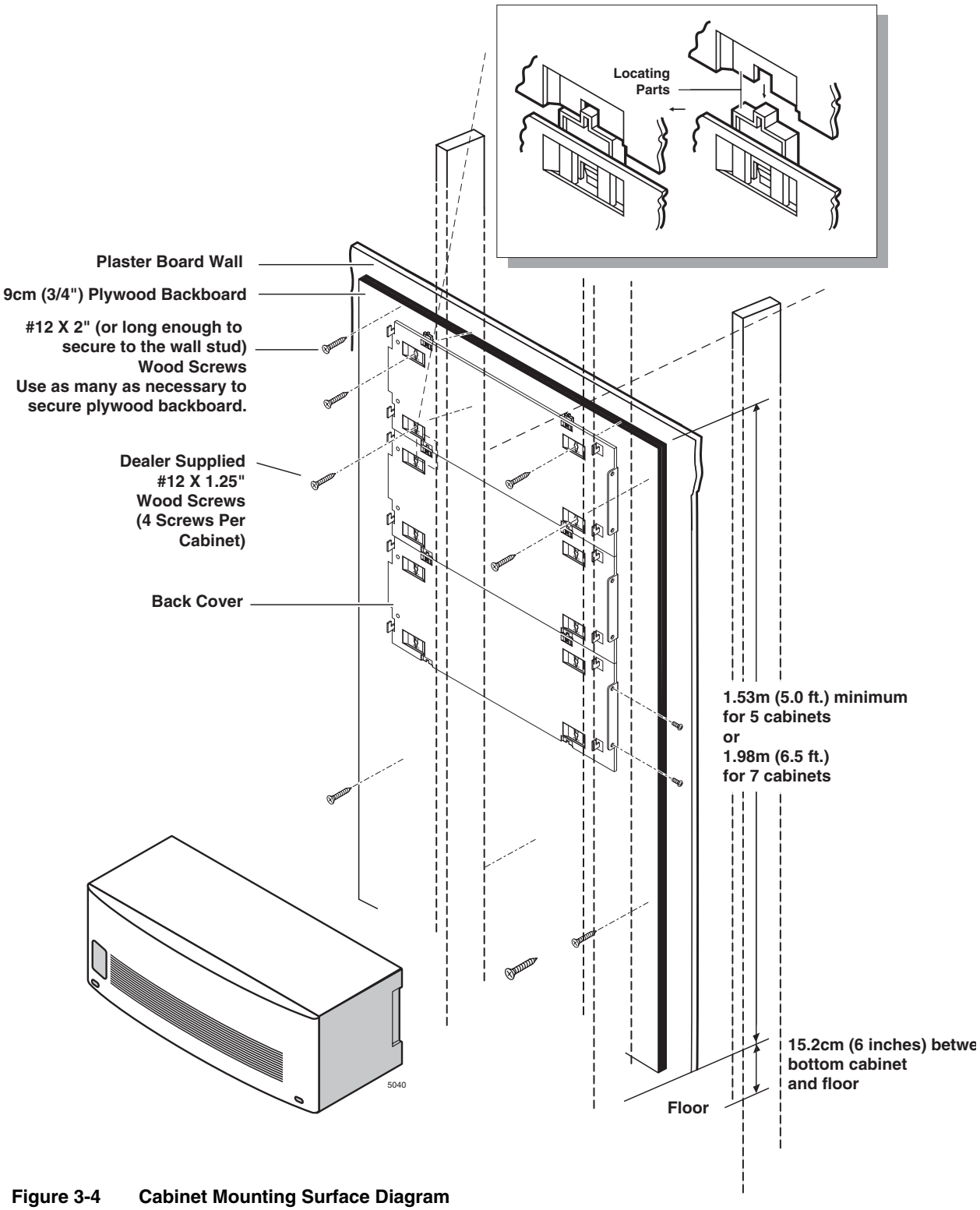


Figure 3-4 Cabinet Mounting Surface Diagram

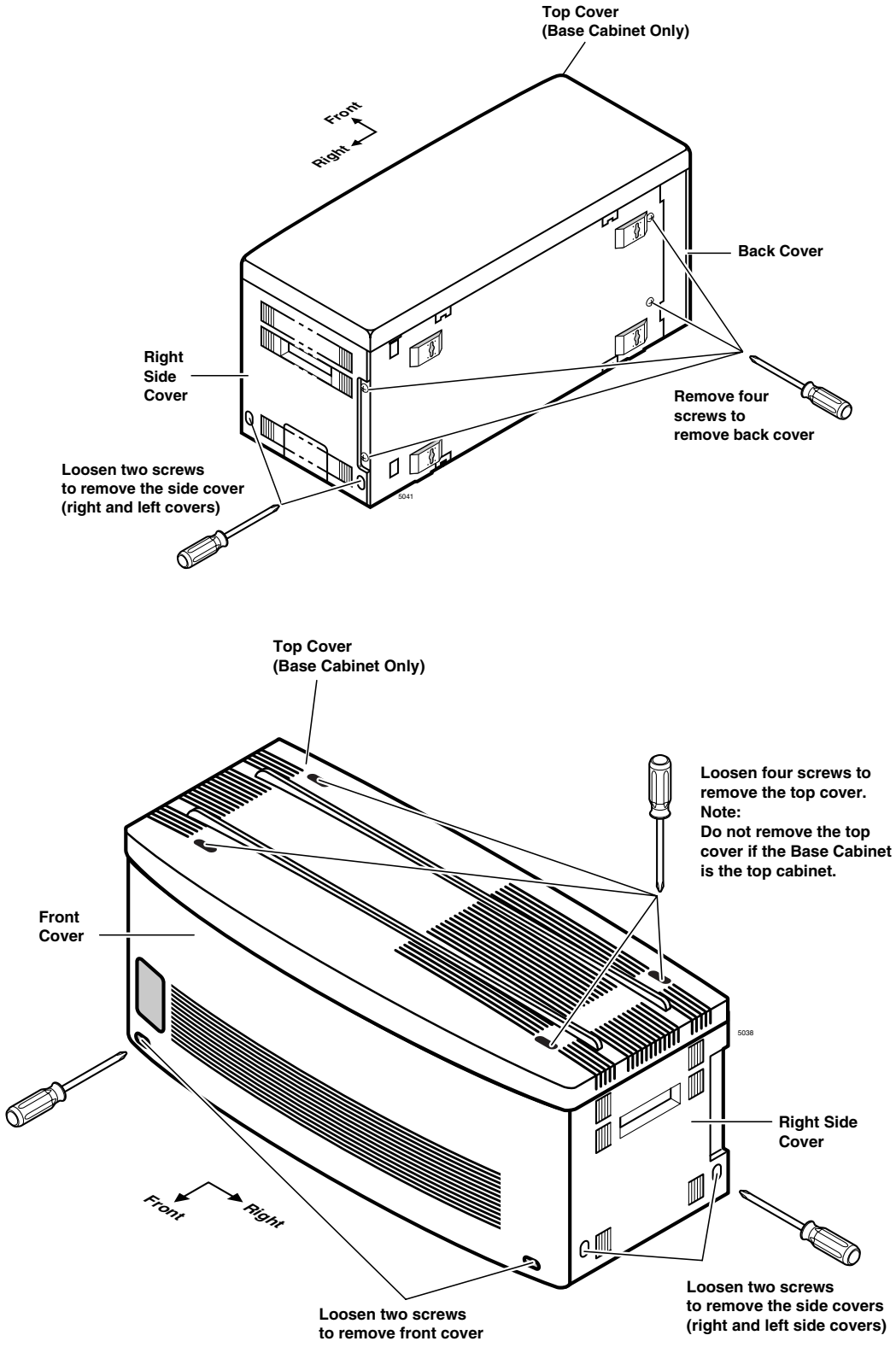


Figure 3-5 Cabinet Cover Removal and Installation

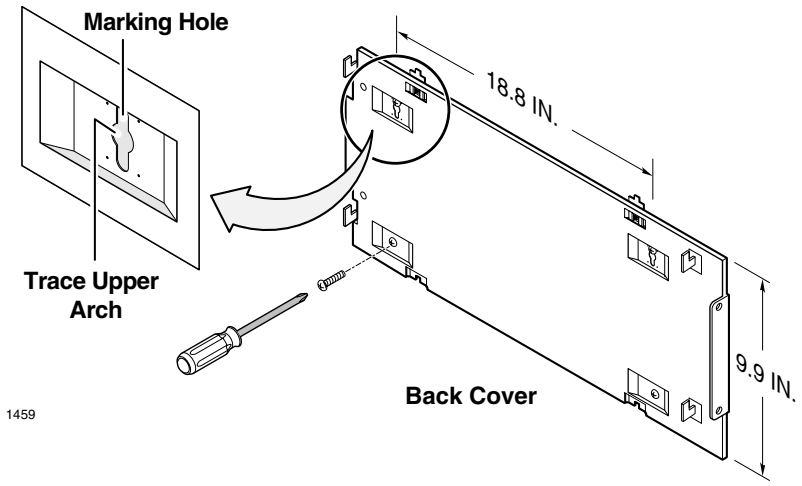


Figure 3-6 CTX670 Back Cover Mounting Holes

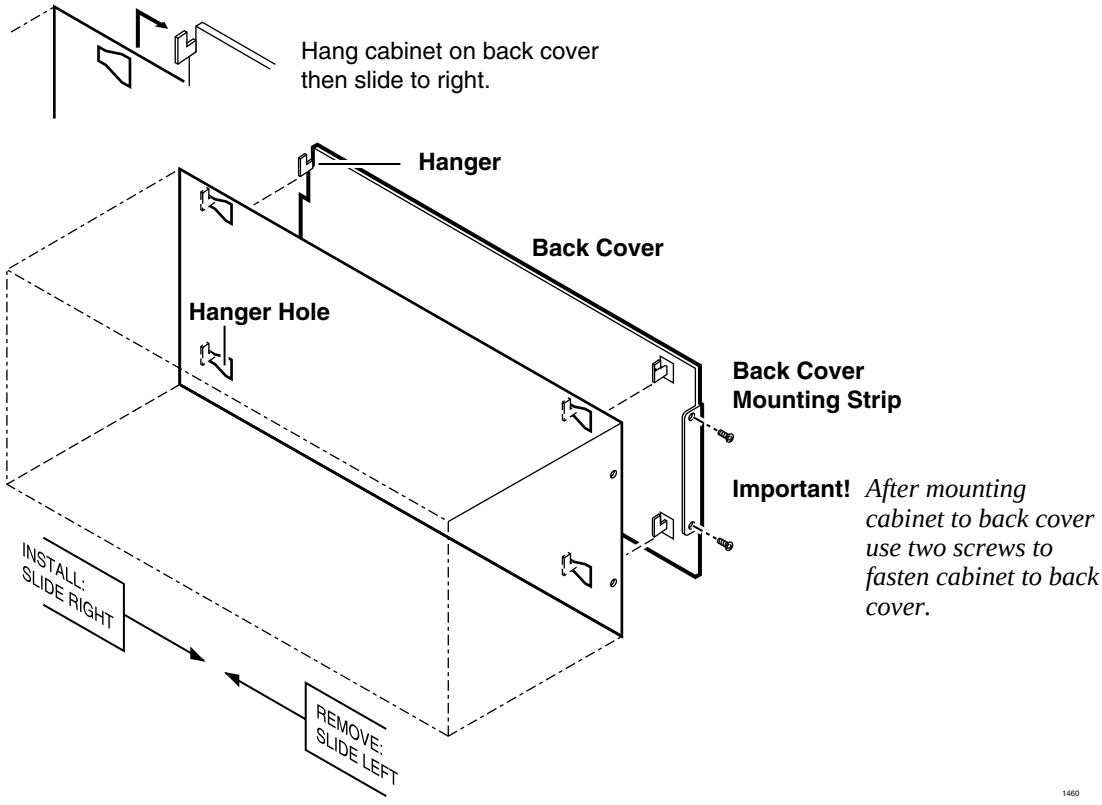


Figure 3-7 CTX670 Mounting Cabinet on Back Cover

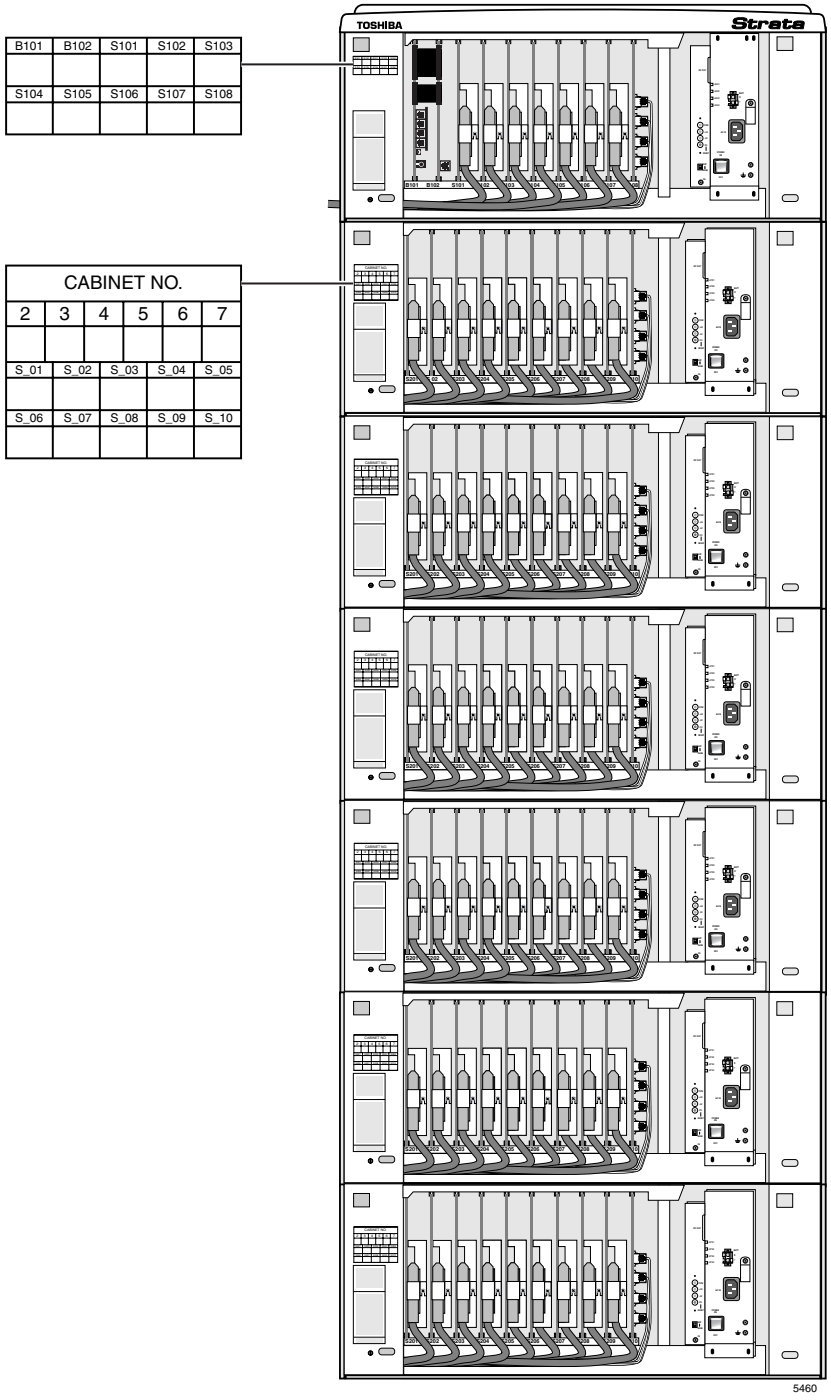


Figure 3-8 CTX670 Cabinet Interior

Step 3: Install Data Cables

1. After mounting the CTX670 cabinets, install the data cables. Then, install the bonding plate per Figure 3-9.

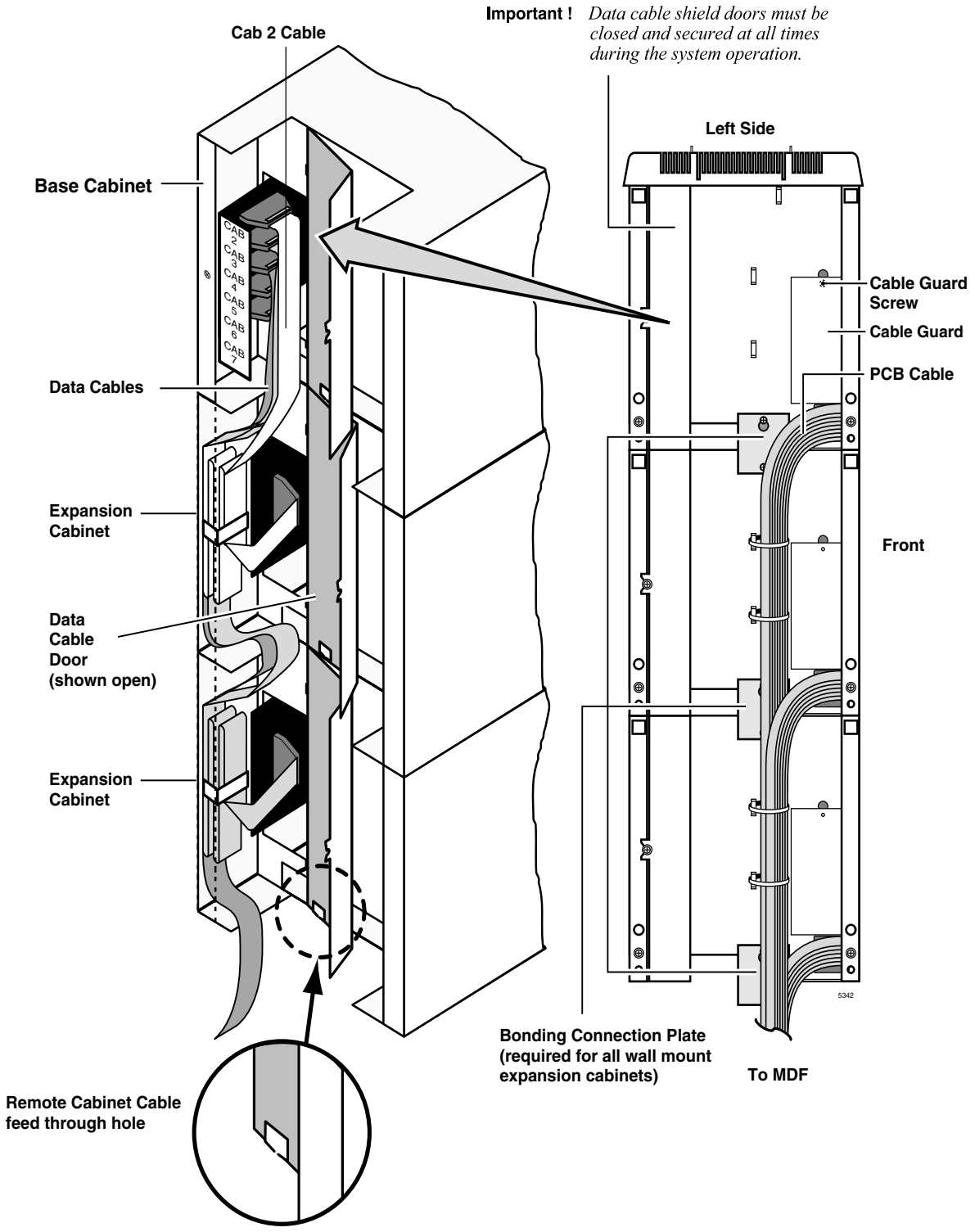


Figure 3-9 Data Cables Shown in Cabinet Interior—Side View

2. Wrap the cables in with the mesh tie. The purpose of the wrap is to shield the cables from EMI/RFI effects. See Figure 3-10.

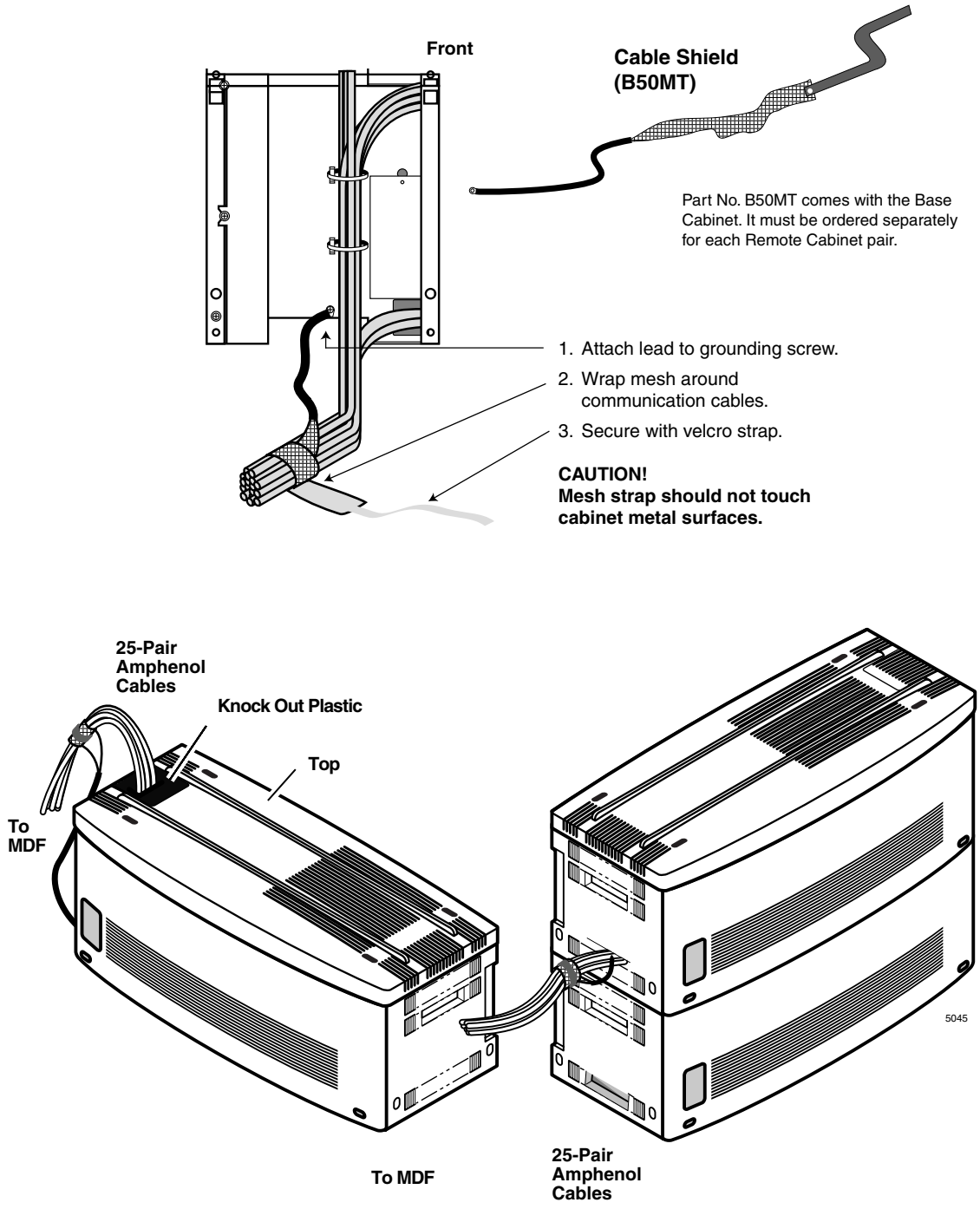


Figure 3-10 Cabinet Amphenol Cables

Step 4: Ground the System

The system requires a solid earth ground for proper operation and safety. The AC power cord(s) already contains a conductor for the “third wire ground” provided by the commercial power outlet (see Figure 3-11, for grounding points “A” and “B”). An insulated conductor must connect the frame ground terminal on the Base Cabinet to a cold water pipe or the building ground (point “B”).

Before connecting the system to the AC power source, measure the impedance of the building ground reference. If the ground path connected to the system has an impedance of 1 ohm or more, a better ground must be installed. In Figure 3-11, the grounding path between point “A” and the single point ground “B” must be less than 0.25 ohms.

The “third wire ground” coming from the primary AC power outlet must be dedicated and must be routed through the same conduit as the phase conductors serving the system. The conductor connected to the frame ground (FG screw) on the system power supply must be insulated and comply with the general rules for grounding contained in ie Regs, 16th Edition, but must not depend on the cord and plug of the system.

If the CTX670 system consists of more than one cabinet, you must install the bonding connection plates that come attached to each expansion cabinet. Refer to Figure 3-9. Connect the mother board ground wires and the intercabinet ground wires per Figure 3-11.

Wrap the cable mesh shield (part No. B50MT) around the 25-pair communication cables that carry stations over tip and ring, per Figure 3-10.

WARNING! Failure to provide a proper ground may be a safety hazard to service personnel or lead to confusing trouble symptoms. In extreme cases, system failure may result because the system is not properly protected from lighting or power transients.

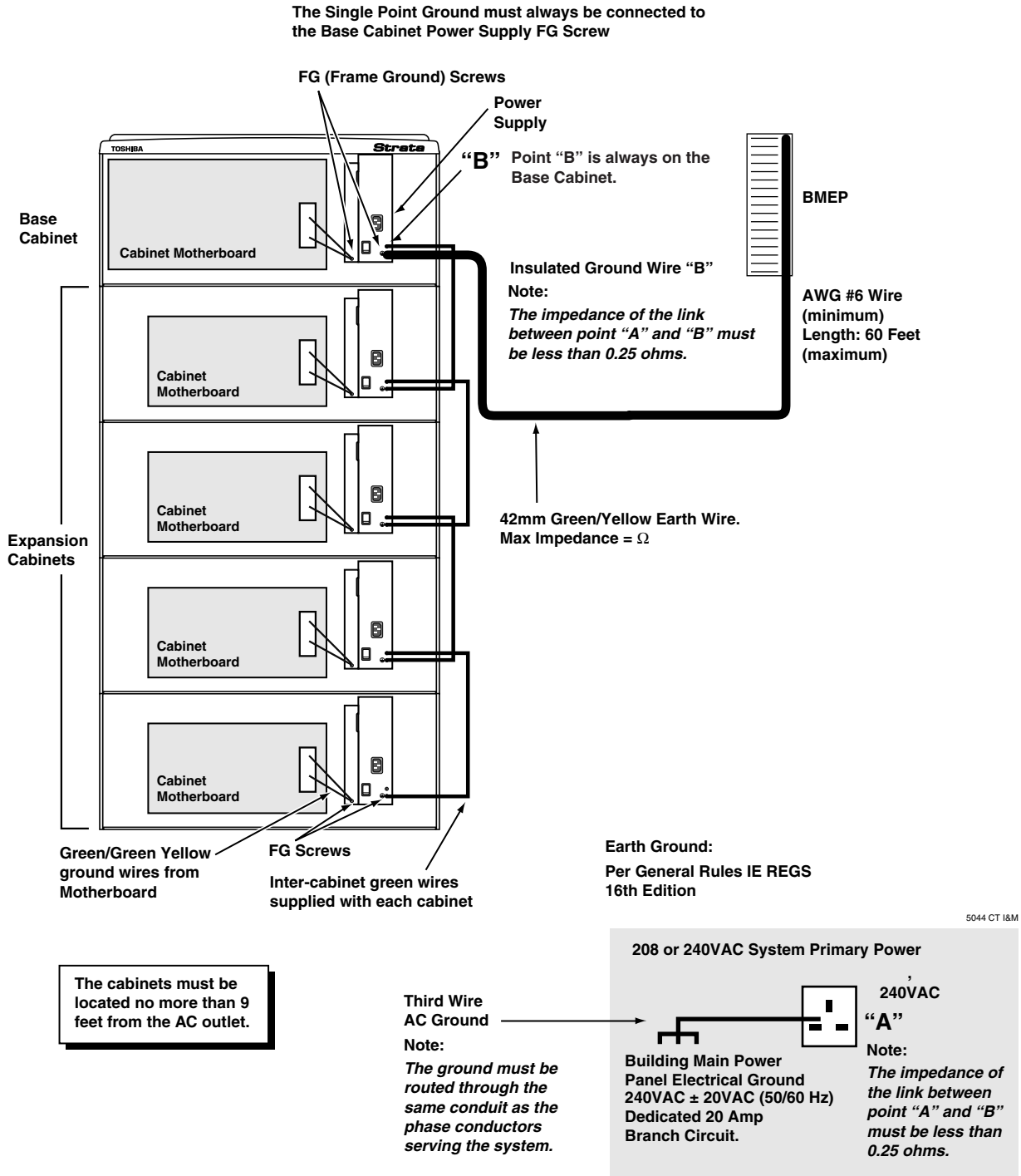


Figure 3-11 Cabinet Earthing

Step 5: Install AC Power Components

AC Power Requirements

The Strata CTX670 requires a single-phase, 50/60 cycles power source of 240VAC, on a dedicated 20 ampere circuit breaker. 240VAC is required for six or seven cabinet systems.

Toshiba recommends that a dedicated AC service panel be used for the CTX670. AC outlets must be dedicated to CTX670 use, fused, and grounded. Equipment unrelated to the CTX670 must not be connected to the circuit or service panel dedicated to the CTX670.

Note It may not always be possible to power a complete CTX670 from a single circuit breaker panel. For example, in the case where a cabinet is remotely located.

To avoid accidental turn-off, do not configure the outlet serving the CTX670 with an On/Off switch. AC outlets serving the cabinets must be close enough so that the power cord from the cabinet power supply or power strip can reach the outlet (these power cords are 2.75m or nine ft.).

AC wall outlets for the CTX670 must be on dedicated 20amp breakers. AC outlets must meet ie Regs.

AC power cabling requirements vary, depending on: The method of cabinet installation (floor or wall mount), AC power source voltage (240VAC) and the number of cabinets. Requirements for distribution of AC power within the cabinets of the CTX670 are as described in Cabinet AC Power Distribution section.

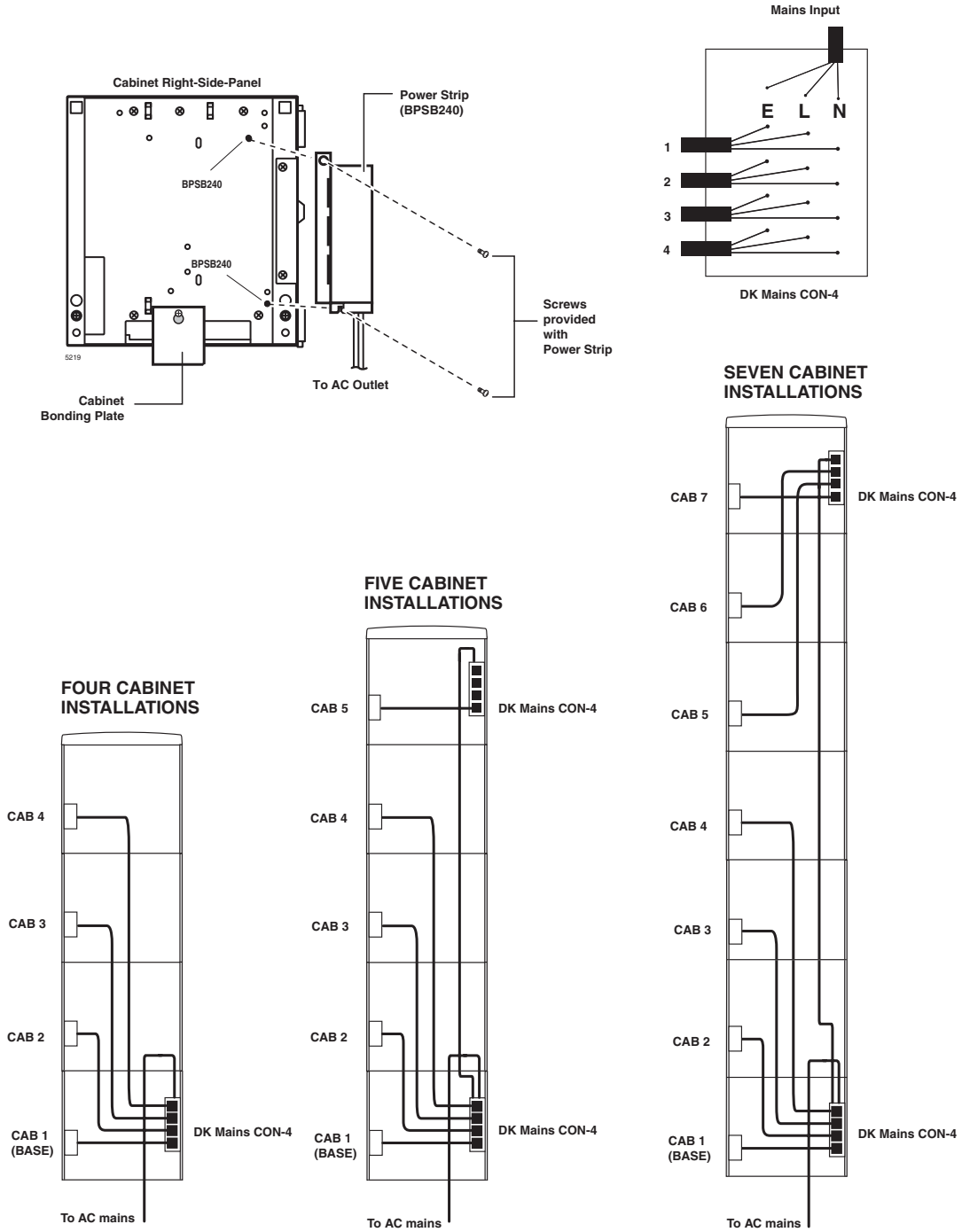
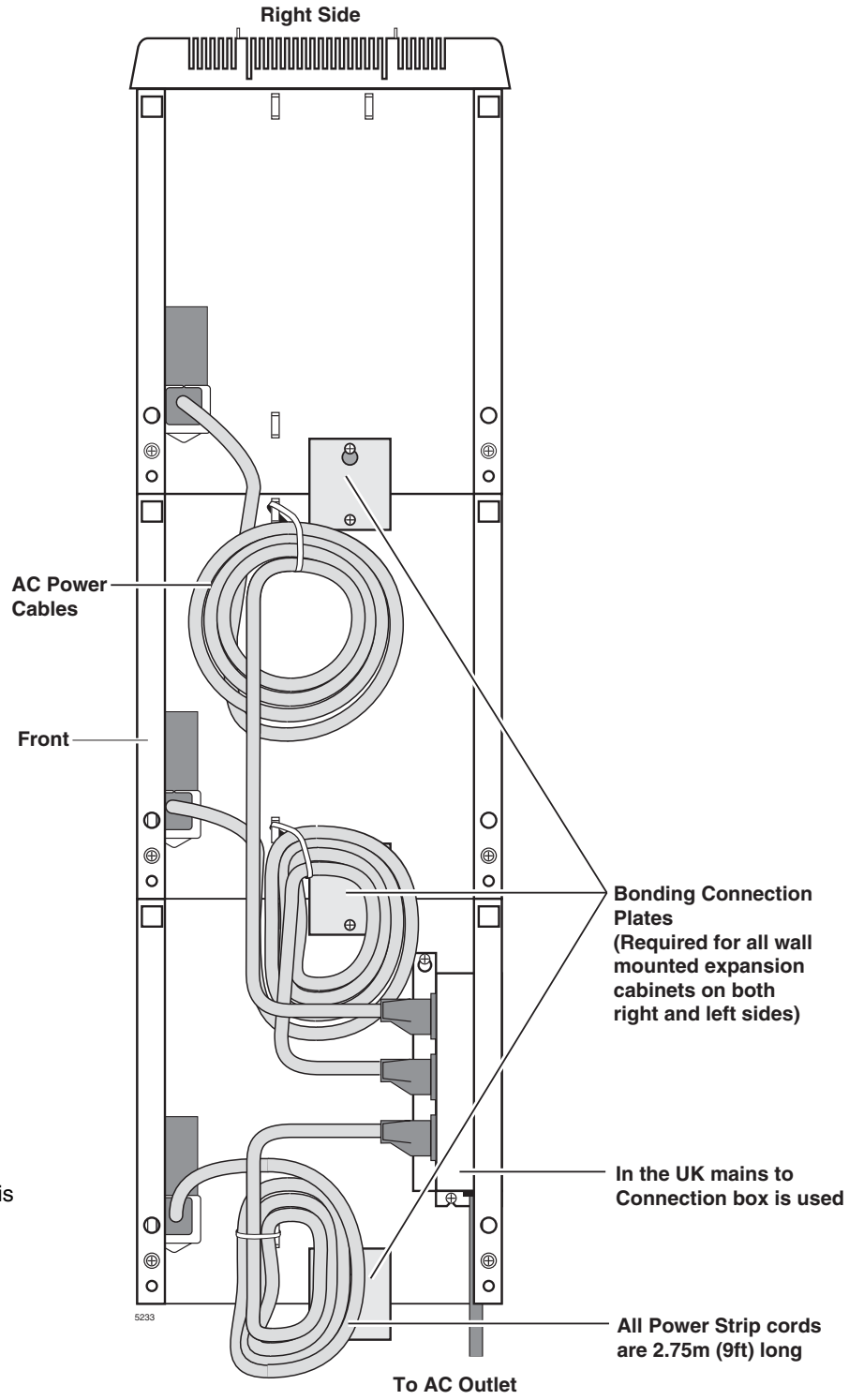


Figure 3-12 AC Power Strip Installation and Power Cords in Cabinets



240VAC power supply cord is shipped with each cabinet.

Figure 3-13 AC Power Strips in Cabinet Interior

Step 6: Install Reserve Power

Two or four customer-supplied, 12VDC batteries (80 amp hours maximum) can be connected to the system as a power failure backup. In the event of a power failure, the system automatically switches over to battery power without any interruption to existing calls or other normal system functions.

Important! *Batteries must be connected when normal AC power is available; they cannot be connected during an AC power failure situation.*

The length of time reserve power operates depends on the system, size and number of batteries provided, and the system load. Typical reserve power duration estimates and battery specifications are estimated with the following considerations (see Table 3-1):

- Batteries have full charge at start of operation.
- Two or four batteries connected per Figure 3-14.
- Batteries are 12VDC, rated at 80 amp/hours each.
- System is operating at full load traffic with LCD phones.
- Batteries used for this test are gel-cell and maintenance-free. Reserve duration will vary depending upon battery type, age, and manufacturer. These figures should only be used as an estimate.

Table 3-1 Typical Reserve Power Duration Estimate

Number of Cabinets	1	2	3	4	5	6	7
Estimated operation time Two-battery configuration	12.0 hrs.	6.0 hrs.	4.0 hrs.	3.0 hrs.	2.5 hrs.	2.0 hrs	1.8 hrs
Estimated operation time Four-battery configuration	24.0 hrs.	12.0 hrs	8.0 hrs	6.0 hrs.	5.0 hrs.	4.0 hrs	3.5 hrs

WARNING! Some batteries can generate explosive gases. Therefore, ensure that batteries are located in a well-ventilated area.

Do not smoke near batteries.

Avoid creating any electrical sparks near batteries.

Use commercially available battery enclosures to reduce risk to nearby people and equipment.

The procedure for installing reserve power varies, depending on the number of cabinets in the system and the mounting method employed in installing the cabinets. The following text details reserve power battery installation requirements.

Reserve Battery Cabinet Components/Cables

The part names and descriptions of the reserve battery cabinet components and cables are shown in Table 3-2.

Table 3-2 Reserve Battery Cabinet Components/Cables

Option	Description
PBTC-3M	A three-meter battery cable used to connect reserve power batteries to the system power supply when the system has less than three cabinets. One reserve power cable is required for each cabinet in a one or two cabinet system (wall or floor mount). The cable connects the CTX670 cabinet power supply directly to the battery terminals (a BBDB is not required).
BBDB	CTX670 reserve power battery distribution box is required when connecting reserve power batteries to three or more cabinets (wall or floor mount). The box is field installed into one of the CTX670 cabinet side panels. The BBDB provides seven BBTC2A-2.0M, battery distribution cables to connect reserve power from the BDDB box to each individual cabinet power supply. One or two BBTC1A-2.0M must be ordered separately when using the BBDB battery distribution box.
BBTC1A-2.0M	A two-meter battery cable used to connect reserve power batteries to the BBDB battery distribution box. One reserve power cable is required in a three or four cabinet system and two cables are required for five or more cabinet systems (wall or floor mount). The cable connects CTX670 BBDB box directly to the battery terminals.

Reserve Power for One or Two Cabinets (Wall Mount)

1. Connect the black jumper wire (supplied with the PBTC-3M cable) from the positive terminal of one 12VDC battery to the negative terminal of the second 12VDC battery (Figure 3-14).
2. Ensure that a serviceable 10-amp fuse is installed in the in-line fuse holder of the PBTC-3M cable.
3. Connect the PBTC-3M battery cable white lead to the open positive terminal of the 12VDC battery. Connect the black lead to the open negative terminal of the second 12VDC battery.

Important! *The cabinet(s) must be connected to the (live) AC power source, and the power supply On/Off switch set to On prior to the final step of connecting the reserve power batteries to the power supply via the BATT+/- receptacle. If the batteries are connected after AC power is lost, reserve power will not function.*

4. Connect the PBTC-3M battery cable two-prong male plug to the Base Cabinet power supply BATT +/- receptacle.
5. Repeat Steps 3 and 4 to connect a PBTC-3M to the Expansion Cabinet.
6. To test reserve power operation, disconnect system AC power plugs with power supply On/Off switches in the On position. The system should continue to operate without interruption.

Note If connecting four batteries, follow the wiring diagram in Figure 3-14.

Reserve Power for Three or More Cabinets (Wall Mount)

1. Install the Battery Distribution Box (BBDB) to the bottom cabinet (see Fig 3-20). The BCCB is not required for wall mount systems.
2. Connect two Cable “C” jumper wires from the positive terminal of one 12VDC battery to the negative terminal of the second 12VDC batter, per Figure 3-14 (Cable “C” is supplied with the BBTC1A-2.0M cable).
3. Ensure that a serviceable 15-amp fuse is installed in the in-line fuse holder of the BBTC1A-2.0M battery cable.
4. Connect the white lead of the BBTC1A-2.0M battery cable to the open positive terminal of the 12VDC battery. Connect the black lead to the open negative terminal of the second 12VDC battery.
5. Connect a second BBTC1A-2.0M in parallel to the first BBTC1A-2.0M cable per Steps 2, 3 and 4 instructions.
6. Plug the two BBTC1A-2.0M battery cables into the Battery Distribution Box.

Important! *The cabinets must be connected to the (live) AC power source, and the power supply On/Off switches set to On prior to the final step of connecting the reserve power batteries to the power supplies via the BATT +/- receptacle. If the batteries are connected after AC power is lost, reserve power will not function.*

7. Connect the BBTC2A-2.0M cables from the Battery Distribution Box to the BATT +/- receptacle of individual power supplies (BBTC2A-2.0M cables are supplied with an BBDB distribution box).
8. To test reserve power operation, disconnect the system AC power plugs with the power supply On/Off switches in the On position. The system should continue to operate without interruption.

Note If connecting four batteries, follow the wiring diagrams in Figure 3-14.

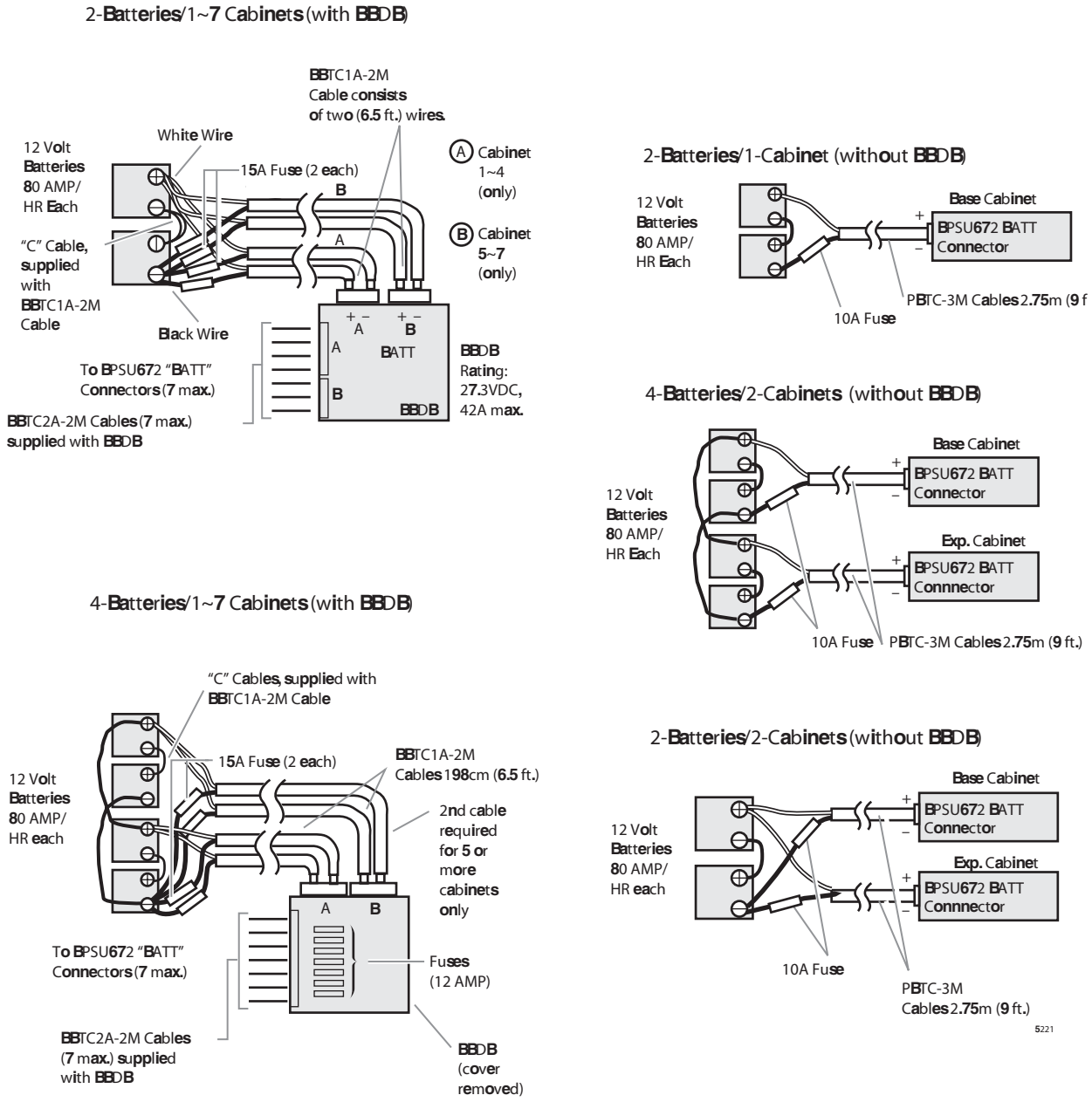


Figure 3-14 Battery Wiring Diagram (Two or Four Batteries) Wall Mount Only

Cabinet Floor Mounting

The part numbers and descriptions of the floor mounting hardware are shown in Table 3-3.

Table 3-3 Floor Mount Hardware

Option	Description
BFIF	Floor mount fixture kit is required when floor mounting two or more CTX670 cabinets. Provides two metal stands for mounting any number of CTX670 cabinets on floor. Three pairs or wall brackets (RWBF) are supplied with BFIF to use when mounting three or more CTX670 cabinets on floor. The wall brackets are needed to secure floor-mounted systems to the wall for safety purposes.

Floor Mounting One or Two Cabinets

1. Remove front, side, and top covers from cabinet(s) (Figure 3-5). Remove plastic locating parts from all cabinet back covers using a Phillips screwdriver.
2. Make sure that cabinet power supplies (BPSU672A) are installed per “Install Power Supply” on Page 3-6.
3. If installing just one or two cabinets, install the BFIF fixtures on each side of the bottom of the cabinet (Figure 3-15) and place the cabinet where it should be installed.
4. Set the bottom cabinet on the floor or mount surface, then set the top cabinet on the bottom cabinet.
5. Fasten the two cabinets together with the four screws provided: (two screws at front “A” and two at back “B” of cabinet. Place cabinet where it should be installed.
6. Connect the Expansion Cabinet data cable to the “CAB. 2” data cable connector on the Base Cabinet (Figures 3-9).

   ...or if installing a Remote Expansion Cabinet: see details in “Remote Cabinet Installation Instructions” on Page 3-43.
7. Install ground wiring, AC and reserve power cabling, and PCB cabling per the “Recommended Installation Sequence” on Page 3-6.
8. Fill out cabinet/slot identification labels on cabinet(s) (Figure 3-8).
9. Reinstall covers on to cabinets (Figure 3-5).

Floor Mounting Three or More Cabinets

This section shows you how to mount three or more cabinets to a concrete, wood or computer room floor. Use the General Steps for all of these methods first, then the specific steps that follow for each method.

1. Make sure that cabinet power supplies (BPSU672A) are installed per "Install Power Supply" on Page 3-6.
2. Remove front, side, and top covers from all cabinets. Remove plastic locating parts from all cabinet back covers using Phillips screwdriver (Figures 3-4 and 3-5).
3. Install a floor fixture (BFIF) on each side of the bottom cabinet. (Make sure that the fixture is inside of the cabinet edge. For Steps 3~10, see Figures 3-15~3-19.
4. Place cabinet two on top of the bottom cabinet and connect them together at points "A" and "B" with the screws provided.
5. Place cabinet three on top of cabinet two and connect them together at points "A" and "B" with the screws provided.
6. If installing more than three cabinets, install wall brackets (RWBF) on the top of cabinet three. Position the three cabinets parallel to the wall (5.1cm or 2" from the wall) and secure the wall brackets to the wall with customer-provided wood screws and wall anchors as required.
7. For systems with just three cabinets, secure the floor fixtures (already attached to the bottom cabinet) to the floor with the customer-provided floor bolts.
8. Refer to the sub-sections that follow the appropriate procedure to anchor the system to concrete, wood, or computer room floor.
9. Add remaining cabinets, making sure that the cabinets are connected together at points A and B with the screws provided.
10. For systems with four or more cabinets, make sure that wall brackets (RWBF) are installed on both sides of the top cabinet, in addition to cabinet three.
11. Check to make sure the cabinets are parallel to the wall. Secure the floor fixtures attached to the bottom cabinet to the floor with the customer-provided floor anchors.
12. Connect the data cable of each Expansion Cabinet to the applicable data cable connector on the Base Cabinet (Figure 3-9). (The data cable from the first Expansion Cabinet should be connected to the connector labelled "CAB. 2", the cable from the second Expansion Cabinet to the "CAB. 3" connector, etc.)
13. Install ground wiring, AC and reserve power cabling, and PCB cabling per the "Recommended Installation Sequence" on Page 3-6.
14. Fill out cabinet/slot identification labels on each cabinet and reinstall covers on the cabinets. (The top cover should be installed on the top cabinet.)

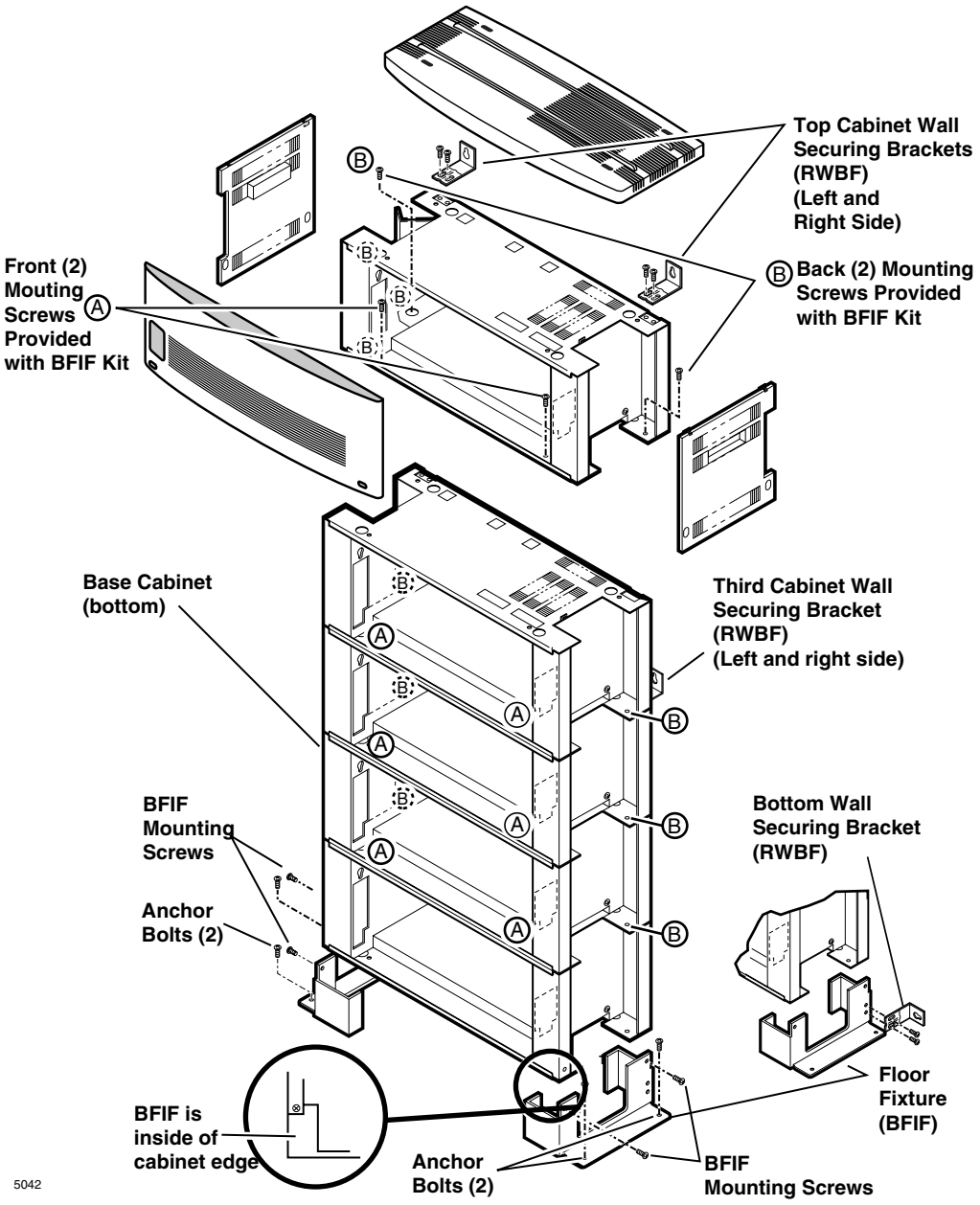
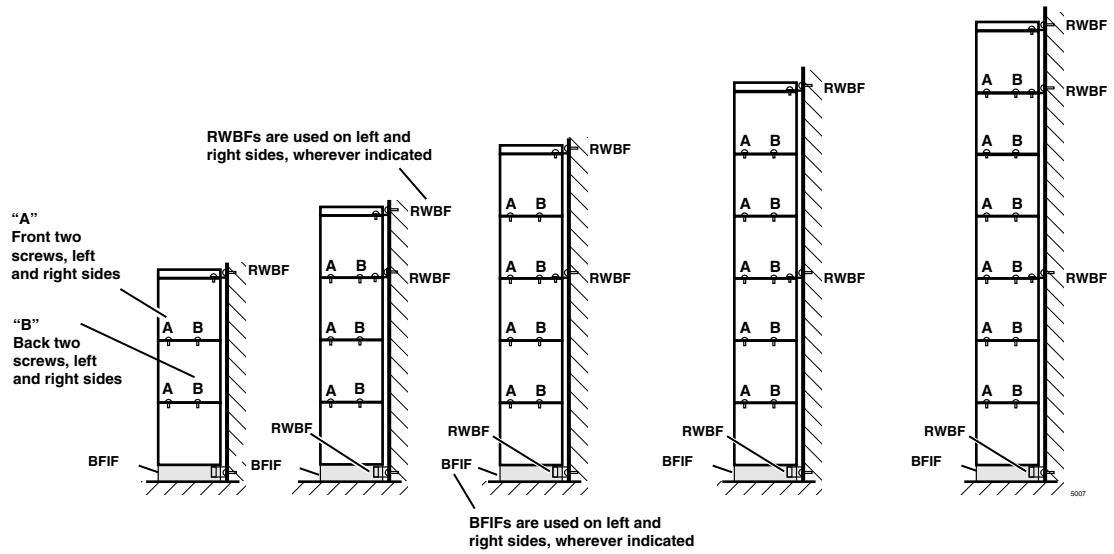


Figure 3-15 CTX670 Cabinet Floor Installation

Important!

- *BFIF (two-each) and RWBFA (six-each) are supplied with the floor installation kit BFIF.*
- *Upper and third cabinets must be fixed to the wall with RWBFS on each side (use #12 x 2 inch wood screws and wall anchors, as required).*
- *Floor fixture (BFIF) must be fixed to floor by either anchor bolts, or wall by RWBF wall brackets (see Figures 3-15 and 3-16).*



Note RWBF (3-pairs) and BFIF Stands (1-pair) are supplied with floor installation kit BFIF.

Figure 3-16 Floor Mounting Cabinet Installation

Bolt Cabinets to Concrete Floor

1. Mount the CTX670 Base Cabinet on Floor Mount Fixtures (see Figures 3-15 and 3-17). Position the Base Cabinet at the selected installation location.
2. Mark the floor where holes will be drilled. Move the Base Cabinet prior to drilling.

Note Cover the Base Cabinet with a drop cloth to protect the power equipment from dust created during drilling.

3. Use a hammer drill to make holes for 3/8-inch bolt anchors.
4. Install the bolt anchors, with plugs, in the drilled holes.
5. Using the driving tool and a hammer, drive each bolt anchor into the floor.

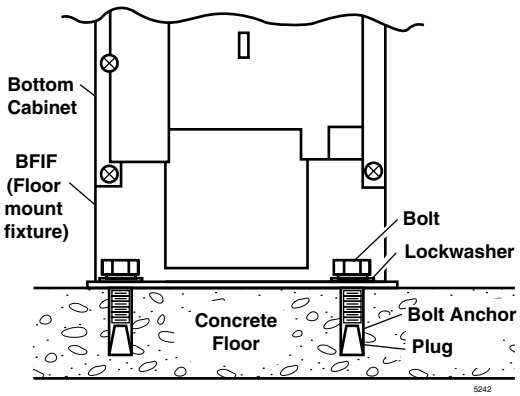


Figure 3-17 Installation on Concrete Floor

6. Move the Base Cabinet into position on the equipment room floor.
7. Secure the Base Cabinet to the floor using bolts, lock washers, and flat washers.

Bolt Cabinets to Wooden Floor

1. Mount the CTX670 Base Cabinet on Floor Mount Fixtures (BFIF). See Figures 3-15 and 3-16.
2. Position the Base Cabinet at the selected installation location.
3. Mark the floor where holes will be drilled. Move the Base Cabinet prior to drilling.

Note Cover the Base Cabinet with a drop cloth to protect the power equipment from dust created during drilling.

4. Drill pilot holes to make insertion of 3/8 inch lag bolts easier, and to prevent splitting of wood flooring.

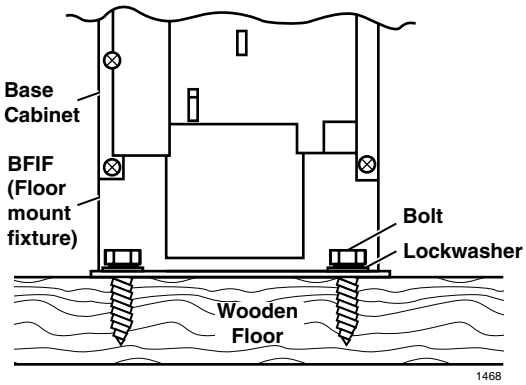


Figure 3-18 Installation on Wooden Floor

5. Move the Base Cabinet into position on the equipment room floor.
6. Secure the Base Cabinet to the floor using lag bolts, lock washers, and flat washers.

Bolt Cabinets to Computer Room Floor

1. Mount the CTX670 Base Cabinet on Floor Mount Fixtures (BIMF). See Figures 3-15 and 3-16.
2. Position the Base Cabinet at the selected installation location.
3. Mark the floor where holes will be drilled. Move the Base Cabinet prior to drilling.

Note Cover the Base Cabinet with a drop cloth to protect the power equipment from dust created during drilling.

4. Drill holes through tile for 3/8-inch threaded rods.
5. After the tiles have been drilled, insert threaded rods through the holes in the tile and mark the concrete floor directly beneath the holes in the tiles.
6. Remove the tiles. Use a hammer drill to make holes for 3/8-inch bolt anchors.
7. Install the bolt anchors with plugs in the drilled holes.
8. Using the driving tool and a hammer, drive each bolt anchor into the floor.
9. Screw threaded rods into each bolt anchor.
10. Install a hex nut, lock washer, and flat washer on each threaded rod. Screw the nuts down far enough to allow floor tiles to be replaced over the threaded rods.
11. Replace tiles over threaded rods in their original positions on the floor.
12. Reach under the tiles, and screw the hex nuts upward until the flat washers are touching the bottom of the tile.

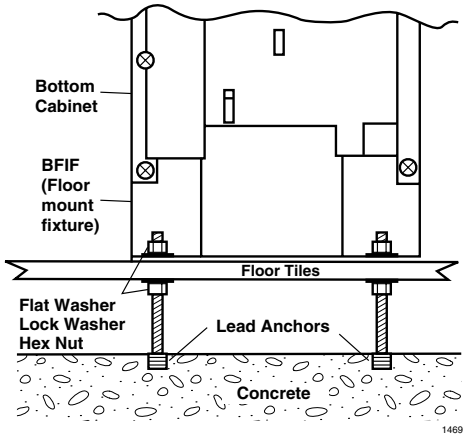


Figure 3-19 Installation on Computer Room

13. Use a hack saw to cut the threaded rods at a height of approximately 3.8cm (1.5”) above the floor tile.
14. Move the Base Cabinet into position over the threaded rods.
15. Secure the Base Cabinet to the floor using flat washers, lock washer, and hex nuts on each threaded rod.Mount Cabinets to Computer Room Floor (Unbolted).
16. Make sure that cabinet power supplies (BPSU672A) are installed per “Install Power Supply” on Page 3-6.
17. Remove front, side, and top covers from all cabinets (Figure 3-5).

Note As shown in Figure 3-5, the two screws on each side cover and the three screws on the front cover (the bottom left screw must be completely removed) should only be loosened and the covers slid to the right for removal.

18. Remove plastic locating parts from all cabinet back covers using a Phillips screwdriver (Figure 3-4).
19. Install a floor fixture (BFIF) on each side of the bottom cabinet (Figures 3-15 and 3-19), making sure that the fixture is inside of the cabinet edge.
20. Secure a wall bracket (RWBF) to both floor fixtures with the screws provided. Secure the wall brackets to the wall with customer-provided wood screws and wall anchors.
21. Place a cabinet on top of the bottom cabinet and connect the cabinets together at points “A” and “B”17 with the screws provided.
22. Install wall brackets (RWBF) on the top of cabinet three and secure them to the wall with customer-provided wood screws and wall anchors.
23. Add remaining cabinets, making sure that the cabinets are connected together at points A and B with screws provided.
24. For systems with four or more cabinets, make sure that wall brackets (RWBF) are installed on both sides of the top cabinet, in addition to cabinet three.
25. Connect the data cable of each Expansion Cabinet to the applicable data cable connector on the Base Cabinet (Figures 3-9). The data cable from the first Expansion Cabinet should be connected to the connector labelled “CAB. 2”, the cable from the second Expansion Cabinet to the “CAB. 3” connector, etc.).
26. Install ground wiring, AC and reserve power cabling, and PCB cabling per the “Recommended Installation Sequence” on Page 3-6.
27. Fill out cabinet/slot identification labels on each cabinet (see Figure 3-8), then reinstall covers on the cabinets. (The top cover should be installed on the top cabinet.)

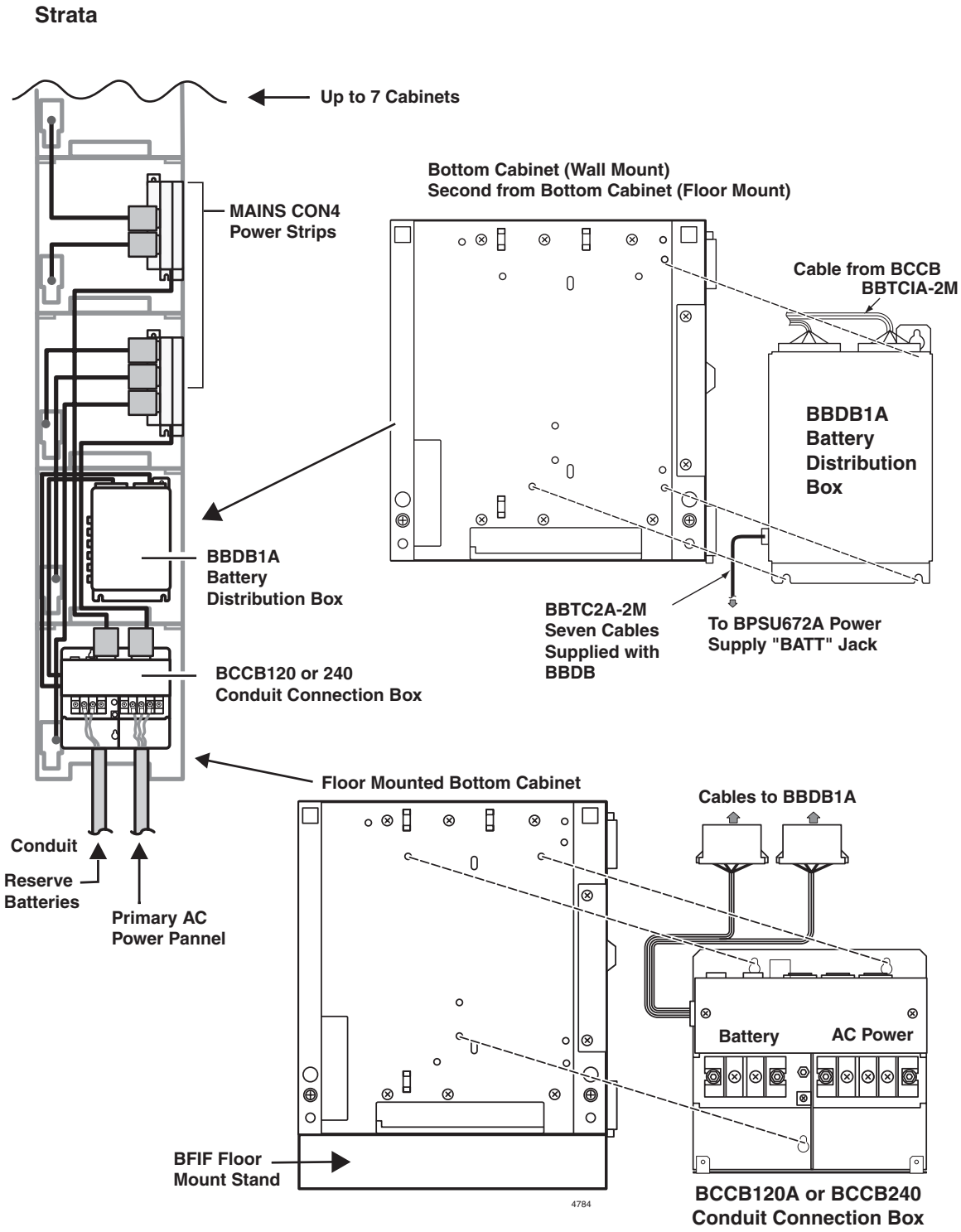


Figure 3-20 Battery Distribution and Conduit Connection Box Installation

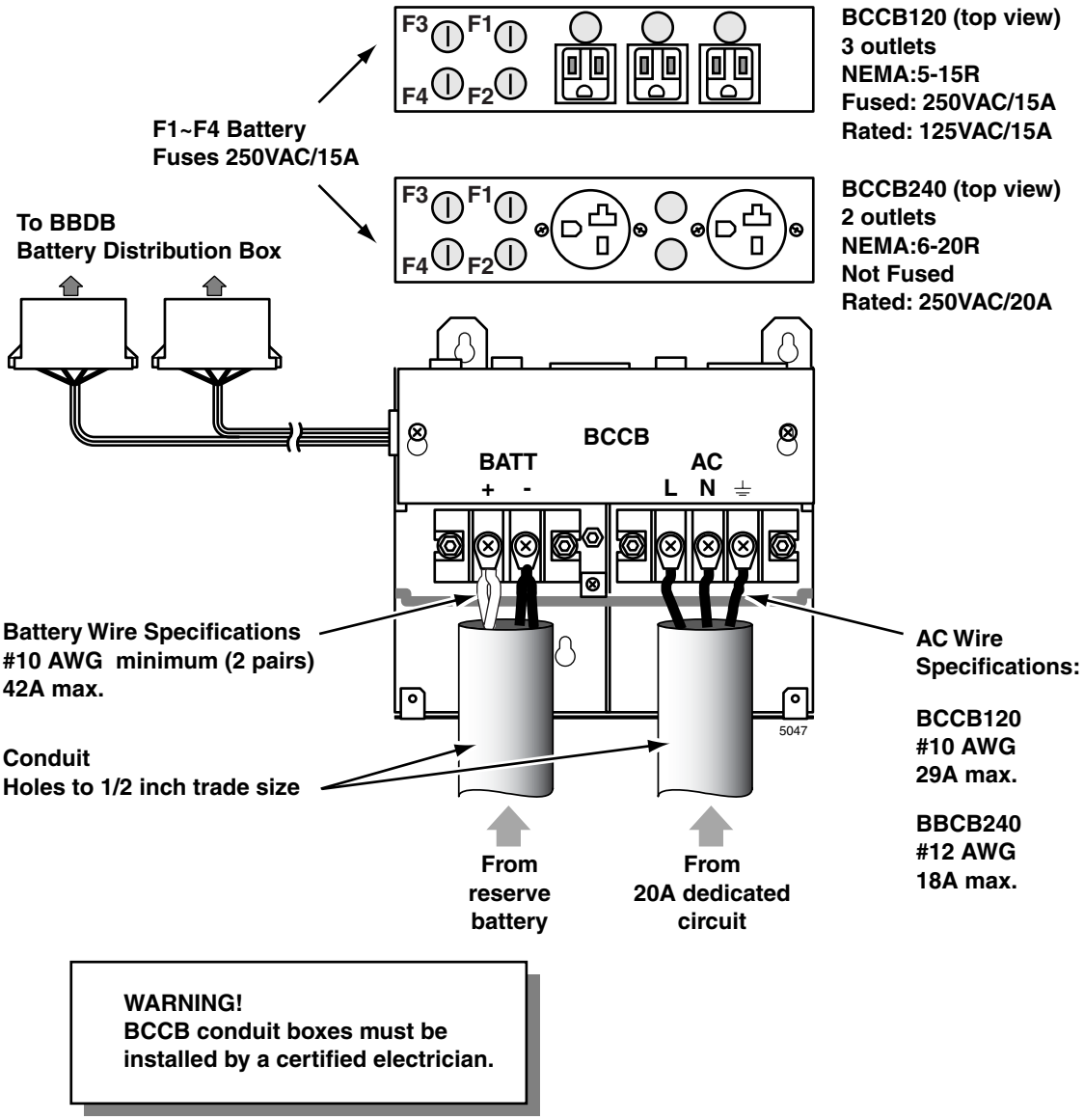


Figure 3-21 BCCB AC Power and Battery Connections

Notes

- When floor mounting the CTX670, the batteries must be installed by a licensed electrician per local electric code using conduit. (See Figure 3-21.)
- Batteries should be installed in a customer-supplied commercial battery box or enclosed rack.

Reserve Power/AC Wiring for Three or More Cabinets (Floor Mount)

➤ **To connect reserve power to floor-mounted systems with three or more cabinets**

See Fig 3-13 and follow these steps:

1. Make sure that the Conduit Connection Box is installed on the bottom base cabinet (see Figure 3-20). The box can be installed by the regular system installer.
2. Have a licensed electrician install conduit and battery cabling to the Conduit Connection Box per local electrical codes. The remaining steps in this procedure can be performed by the regular system installer (see Figure 3-21).
3. Install the Battery Distribution Box on the second cabinet (the cabinet directly above the bottom cabinet), see Figure 3-20.
4. Plug the two Conduit Connection Box cables (coming from the left side of the BCCB box) into the Battery Distribution Box (BBDB).

Important! *The cabinets must be connected to the (live) AC power source, and the power supply On/Off switches set to On prior to the final step of connecting the reserve power batteries to the power supplies via the BATT +/- receptacle. If the batteries are connected after AC power is lost, reserve power will not function.*

5. Connect cables from the (BBDB) Battery Distribution Box to the BATT +/- receptacle of individual power supplies. BBTC2A-2M cables come with each BBDB distribution box.
6. To test reserve power operation, turn off the system AC power circuit breaker with power supply On/Off switches in the On position. The system should continue to operate without interruption.

Note AC/DC wiring and conduit must be installed by a licensed electrician per local electrical code (conduit trade size is 1.27cm or 1/2 inch).

See "Install Reserve Power" on Page 3-23 for battery specifications and wiring guidelines.

Step 7: Install Processor and Universal PCBs

This section provides procedures for the installation of CTX670 processor (or common control) PCBs.

The CTX670 system Base and Expansion Cabinets are shipped empty. PCBs are not installed at the factory. Universal PCBs must be placed according to the configuration information obtained and developed in Chapter 1 – Strata CTX Configuration. Processor PCB installation is in Chapter 4 – PCB Installation.

- Install PCBs only after installing the Base Cabinet and, if applicable, Expansion Cabinets per the Cabinet Installation section in this chapter.
- Be sure the power supply has been tested and the ground has been checked (see "Install Power Supply" on Page 3-6.
- Install universal slot PCBs per the CTX670 configuration guidelines (see "Strata CTX670 Cabinet Slot Configuration" on Page 1-23.
- Install the metal mesh shield, B50MT around the 25-pair cables connected to PCBs per Figure 3-10.

PCB Installation Considerations

The Base Cabinet has ten slots. The first two slots, labelled “B101” and “B102” are reserved for the common control unit and future feature upgrades. The next eight slots (labelled “S101” ~“S108”) are universal and capable of hosting any of the station, line, and option interface PCBs compatible with the CTX670 systems.

The Expansion Cabinets have ten universal slots, labelled “S_01,” “S_02,” etc., where the blank space of the label represents the number of the Expansion Cabinet. Like the universal slots in the Base Cabinet, these universal slots are capable of hosting any of the station, line, and option interface PCBs.

Cabinets are numbered from 1 to 7. The Base Cabinet is numbered 1; the first Expansion Cabinet, number 2; the second Expansion Cabinet, number 3, etc. See the CTX670 Configuration and PCB Installation section for details.

PCB Option Considerations

CTX670 PCBs can be configured for a variety of hardware and software options. Hardware options are defined as either internal (generally related to optional PCB subassemblies) or external (related to connection of peripheral equipment such as background music, voice mail, etc.).

Hardware Options

Some PCBs must be configured for hardware options prior to installation of the PCB in the cabinet. Configuration instructions for internal hardware options are provided in the individual PCB installation procedures in this chapter and in Chapter 4 – PCB Installation. Configuration instructions for external hardware options are provided in Chapter 8 – Peripheral Installation.

Software Options

PCBs are configured for software options through programming, following the installation instructions of the PCBs. A programming overview for each PCB is provided in the individual PCB installation procedures in this chapter. Refer to the *Strata CTX Programming Manual* for detailed programming instructions.

BECU/BBCU Installation

CAUTION!

- **Do not remove the plastic insulation shield from the back of the BBCU PCB. If the shield comes off, do not allow the back of the PCB to contact metal.**
- **The BBCU PCBs are shipped from the factory with the battery jumper in the “Off” position. Ensure it is moved to the “On” position before installing the BBCU to protect customer configuration information stored in the BBCU RAM.**
- **When transporting the BBCU PCB, keep the battery jumper in the “On” position in order to save the configuration data stored in BBCU RAM. (The battery will protect RAM for approximately six years.) Otherwise, to conserve the lithium battery, move the jumper to the “Off” position.**
- **When packaging the BECU and BBCU PCBs, use only a nonconducting material enclosure, such as plain cardboard. Conductive material can cause the internal battery to discharge and erase memory in the BECU and BBCU PCBs.**

1. Set the battery jumper, “BATT,” on the BBCU PCB to the “On” position.
2. On the BBCU, make sure the Mu/A jumper plug is set to the A position (U.K.).
3. Before you install the BBMS, make sure the “ATTACHED BBMS” jumper is set to “NO.”
4. After installing the BBMS, change the “ATTACHED BBMS” jumper to “YES.”
5. If you are installing the Basic system, skip to Step 6. If you are installing the Expanded system, install the BBMS and BEXS onto the BBCU and BECU respectively.
6. Install the BBMS onto the BBCU (see Figures 3-22 and 3-23). Install the BEXS onto the BECU (see Figures 3-24 and 3-26).
7. If serial ports are required, install the BSIS onto the BECU (see Figures 3-25 and 3-26).
8. Make sure that the power supply is Off when installing the BBCU and BECU PCB or damage to the board could result.
9. Install the BECU in slot B101 and the BBCU in slot B102, then connect the two BECU ribbon cables to the BBCU, as shown in Figure 3-27.
10. Proceed with system startup procedure in the *Strata CTX Programming Manual.*

➤ **To adjust the CTX670 MOH/BGM source**

➤ Adjust the VR1 potentiometer to the desired volume level while listening to MOH or BGM (see Chapter 8 – Peripheral Installation).

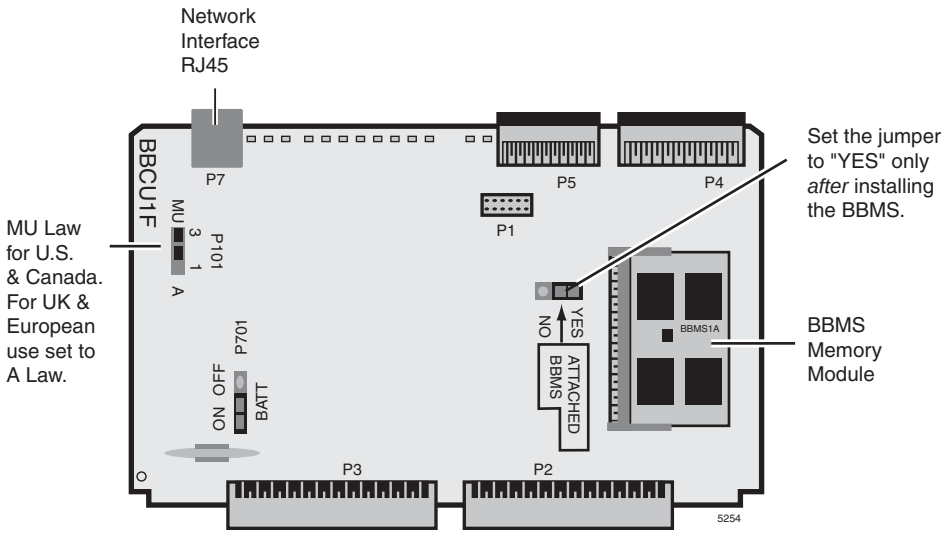
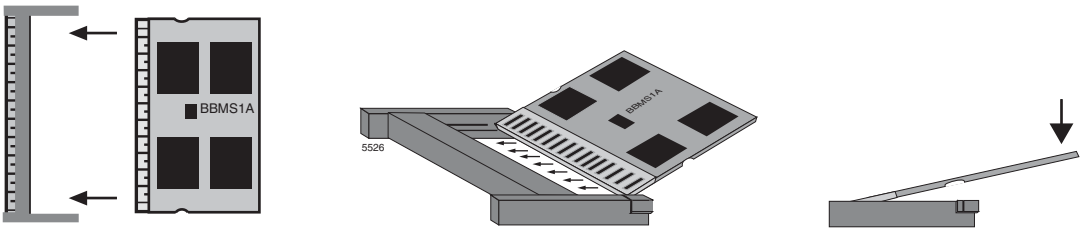


Figure 3-22 BBCU Processor PCB

CAUTION! Be careful installing the BBMS (Figure 3-23). It is fragile.



1. Hold the BBMS top-side up. The top side has five chips and “BBMS1A.”
2. Slide the BBMS into the socket.
3. Push down on the outer edge of the BBMS. It should “snap” down.

Figure 3-23 Installing the BBMS Backup Memory Module on the BBCU

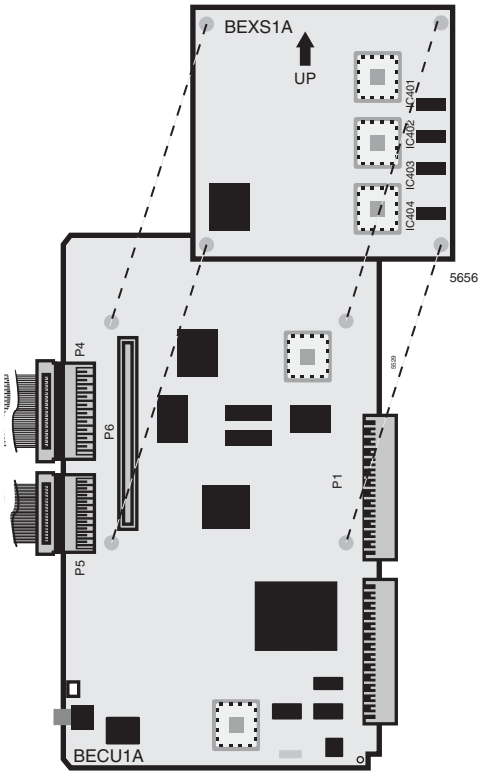


Figure 3-24 Installing BEXS onto BECU

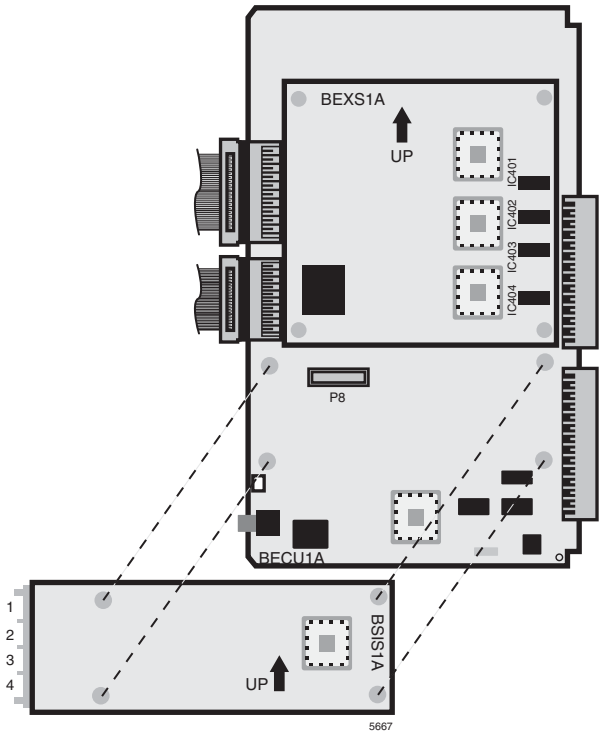


Figure 3-25 Installing BSIS onto BECU

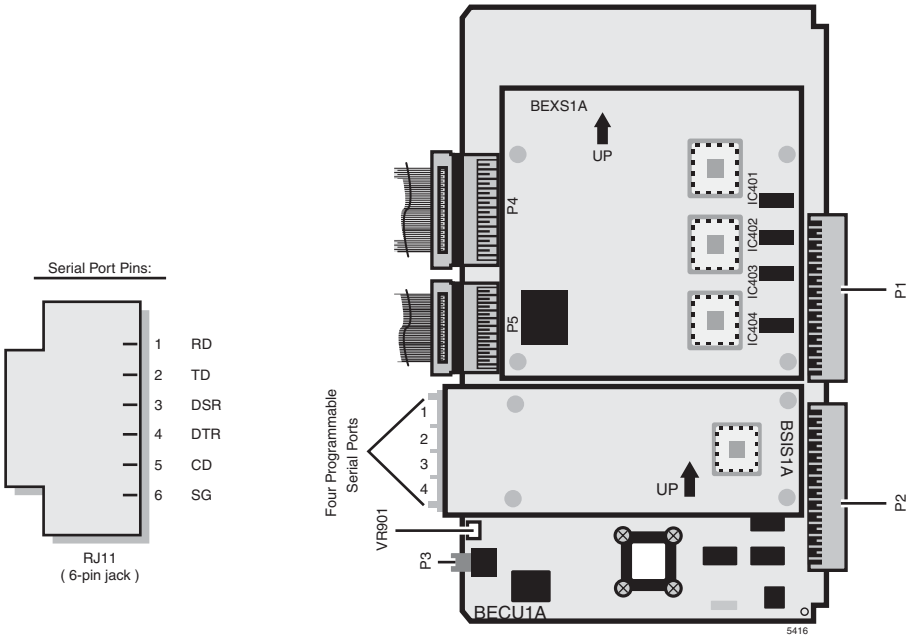


Figure 3-26 BECU with BEXS and BSIS

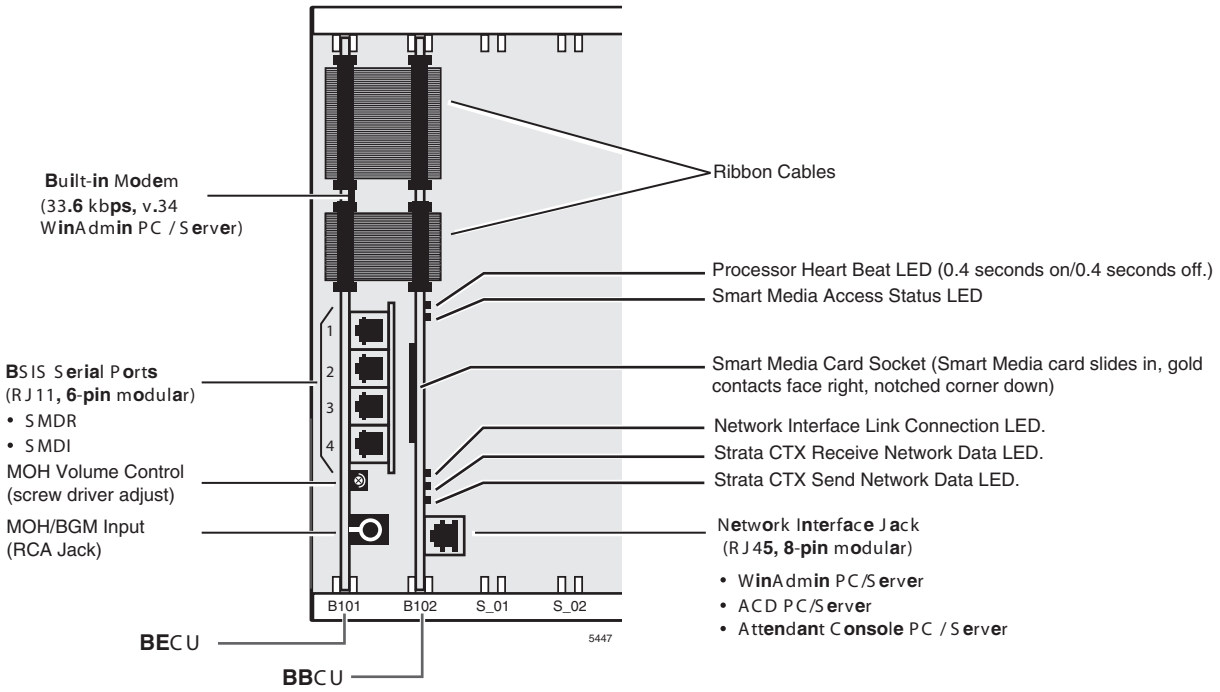


Figure 3-27 Processor PCB Connectors

11. Insert the BECU into the “B101” slot in the Base Cabinet (see Figure 3-27). Ensure the component side of the BBCU PCB is facing right when installing it in the Base Cabinet.
12. Insert the BBCU into slot B102.
13. Connect the supplied ribbon cables between BECU and BBCU.
14. Insert the SmartMedia card (gold contacts face right, notched corner faces forward and down) into the slot on the BBCU Figure 3-27 and 3-28.

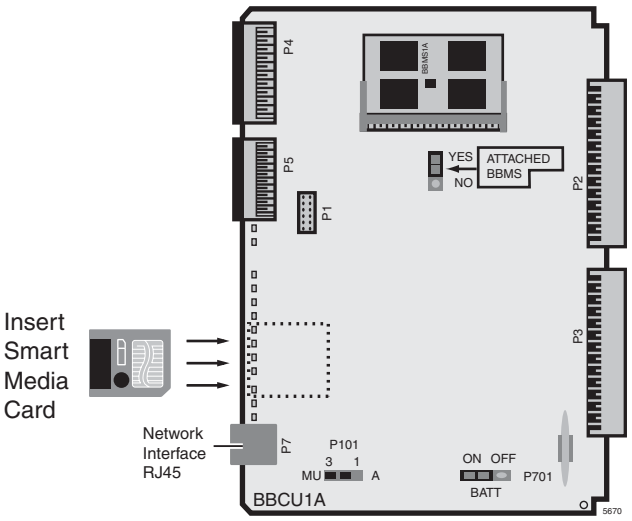


Figure 3-28 SmartMedia Card Installation

CAUTION! Heed any warnings or handling instructions in the SmartMedia Card User’s Manual.
Avoid bending or subjecting the card to impact.
When the card is not in used, store it in its sleeve.

Avoid touching the connectors and protect the card from dirt, dust and liquids. Toshiba recommends backing up important data stored on the card.

Table 3-4 BECU Controls, Indicators, and Interface Connectors

Control/Indicator/Connector	Type of Component	Description
VR901	Trim potentiometer	Adjusts volume for MOH/BGM sources.
P3	RCA jack	BGM/MOH interface
Connector P5	Connector and ribbon cable	Ribbon cable connector to BBCU.
Connector P4	Connector and ribbon cable	Ribbon cable connector to BBCU.
BSIS	Four ports of I/O RS-232	(Optional unit) Adds up to four serial ports.
BEXS	Time switch	(Optional unit) Required for Expanded system, along with the BMMS.

Table 3-5 BBCU Controls, Indicators, and Interface Connectors

Control/Indicator/Connector	Type of Component	Description
BATT	Jumper plug	Must *always* be in the On position to retain processor RAM data. The Strata CTX will not operate properly if the jumper is in the Off position or if it is not installed.
P7	RJ45	Network interface port.
BBMS Module	Subassembly module	Memory module. (Optional unit) Required for Expanded system, along with the BEXS.
ATTACHED BBMS (Yes/No)	Jumper	Jumper setting must always be set to “Yes,” regardless of whether the BBMS is installed or not.
P4	Connector and ribbon cable	Ribbon cable connector to BECU.
P5	Connector and ribbon cable	Ribbon cable connector to BECU.
P10 A Law	Jumper plug	Jumper setting must be set to “A” law in the U.K. For more information on A law settings, see “Country Settings On/Off” on Page 7-19.
	SmartMedia Card socket	Holds SmartMedia Card which is used to Backup/Restore Customer Data, Upgrade Operating System, Log and Trace Maintenance information.

Remote Expansion Cabinet Unit

The RRCU1A PCB enables a CTX670 Expansion Cabinet to be located up to three kilometers from its Base Cabinet. One RRCU1A connects to up to two ribbon-type Data Cables and applies the inter-cabinet signal to a fibre-optic pair. One fibre pair can support one or two expansion cabinets in one remote location using one RRCU1A in the Base Cabinet and another in the Remote Expansion Cabinet.

A CTX670 Base Cabinet will support up to five RRCU1A PCBs. A CTX670 will support up to four Remote Expansion Cabinets.

An inter-cabinet Data Cable in the Base Cabinet is attached to an RRCU1A which converts the signal and uses an LED source to apply the signal to 500 MHz/km multi-mode fibre. Another RRCU1A in the Remote Expansion Cabinet receives the LED signal, converts it back to its original form and applies it to a ribbon Data Cable connected to the Remote Expansion Cabinet. See Figure 3-29.

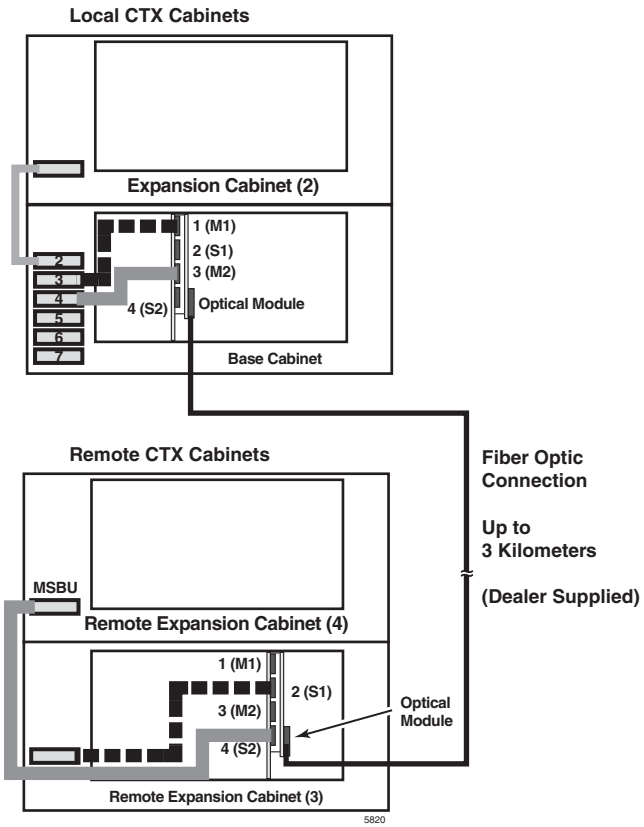


Figure 3-29 Remote Expansion Cabinet Connection

This is a hardware solution and has no effect on software or administration. Remote cabinets support all line and trunk interfaces. Network clock signals can only be derived from digital trunks installed in the Base Cabinet (Master) location.

RRCU1A cards are used at both the Base (Master) and Remote (Slave) Cabinet locations. The card set consists of an RRCU1A PCB and its ROMS1A daughter board. The RRCU1A connects to the inter-cabinet Data Cables, holds the Remote/Slave option jumpers, and has an RS-232C port for monitoring the fibre connection. (See Figure 3-32.)

The ROMS1A daughter board holds an SC-type fibre connector, a connector for control of two 8-circuit DPFT units, and status LEDs.

Remote Cabinet Installation Instructions

All instructions apply to both the Base Cabinet and the Remote Expansion Cabinet except where specifically noted.

1. Install cabinets according to the instructions given at the beginning of this chapter. Pay particular attention to wiring and grounding instructions given for Remote Expansion Cabinets.
2. If installing a standalone Remote Expansion Cabinet, or the first in a stack, set the “BASE/EXP” switch to “BASE” in accordance with Figure 3-3.
3. Cabinets in which RRCU cards are installed must be modified to protect the routing of the cables through the cabinet.
   - Attach the plastic guide to the bracket provided with the RRCU1A card. See Figure 3-31.
   - Attach the bracket to the inner wall of the cabinet.
4. Install the RRCU Card
   - Select correct jumper options (see Figure 3-32). On the Master side, both option plugs connect the centre pin to the upper pin (M1, M2). On the Slave side, both option plugs connect the centre pin to the lower pin (S1, S2).
   - Remove the protective rubber cap from the fibre connector on the ROMS1A daughterboard. See Figure 3-33.
5. Install a BCTC1A top cover on the topmost cabinet (see Figure 3-30).

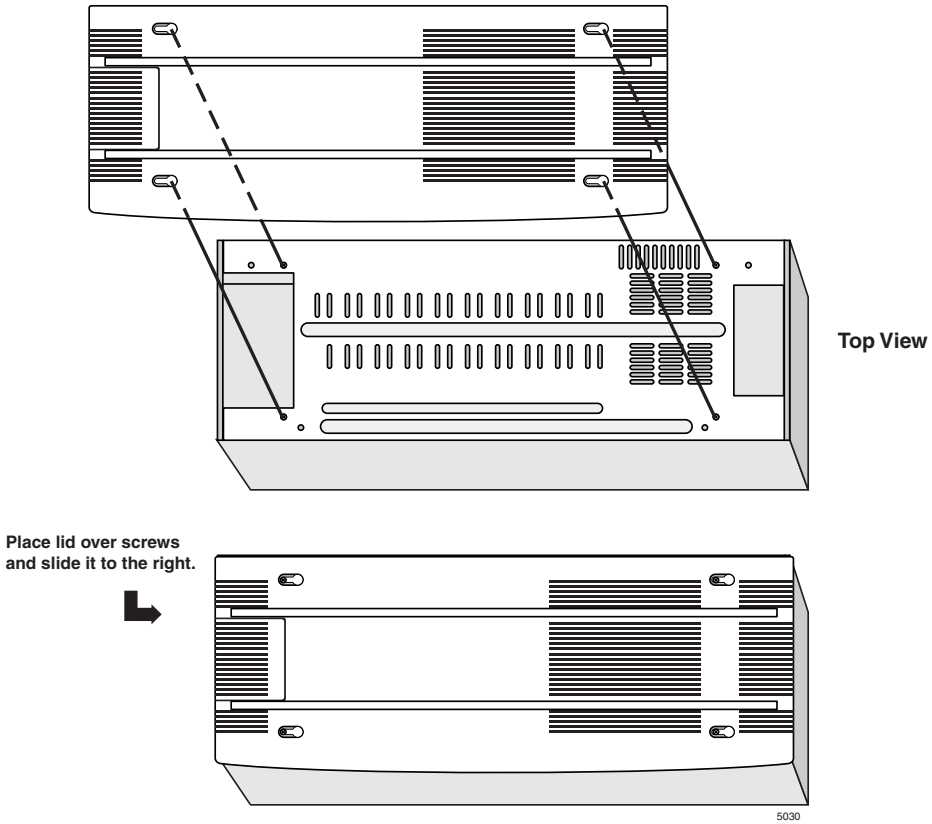


Figure 3-30 Remove/Replace Remote Cabinet Cover

Important! *When installing the RRCU, be sure to put the card in the slot before attaching the data cables. Detach the data cable before removing an RRCU1A. Failure to do so may cause interference with other data highways.*

6. Insert the cards
   - On the Master side, the RRCU card may be installed in Slots 101~107.
   - On the Slave side, the RRCU card may be installed in Slots 101~109.
   - The RRCU1A is a non-timeslot card and can be installed in slots normally left vacant adjacent to digital trunk cards.
7. Connect the data cables
   - At the Base Cabinet, attach an BDCL1A data cable from the data cable connector at the left of the cabinet to Connector M1 or M2 on the RRCU card. (Cables are provided according to the connectors on the RRCU card to which they are attached, see Table 3-6.)
   - The cabinet connected to M1 in the base emerges on connector S1 of the RRCU1A at the Remote Expansion Cabinet.
   - The cabinet connected to connector M2 of the RRCU in the base emerges on connector S2 of the RRCU1A at the Remote Expansion Cabinet. See Figure 3-32.
     - Route the cable through the cabinet according to Figure 3-31.
     - Coil the excess and attach it to the grommet on the cabinet wall with a tie wrap. Be careful not to bind the cable tightly.
     - Close the data cable doors.

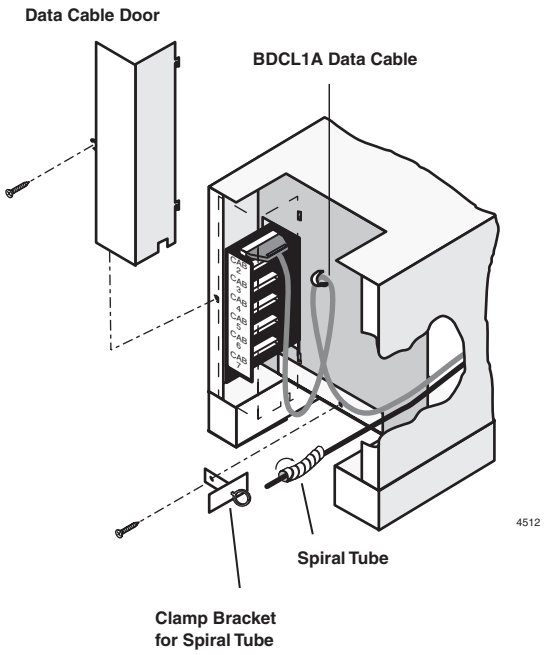


Figure 3-31 Insert Optical fibre Through Cabinet

Table 3-6 Remote Cabinet Data Cables and Connectors

Data Cables	RRCU Connectors			
	M1	S1	M2	S2
BDCL1A-MS1	X	X		
BDCL1A-M2			X	
BDCL1A-S2				X

X=applies to connector

8. Connect the fibre optic cables
   - Pass the fibre optic cable through the protective tube.
   - Route the tube through the clamp attached to the inner cabinet wall and secure the clamp
   - Attach fibre to the SC connectors on the ROMS1A daughterboard.
   - The TX side of the Master connects to the RX side of the slave.
   - The RX side of the Master connects to the TX side of the slave.
   - TIU recommends that the cables be marked within the cabinet for ease of maintenance.
   - Observe the minimum bend radius of 30mm.
9. Restore power.

The RRCU PCB and its controls and connectors are shown in Figure 3-32 and Table 3-7.

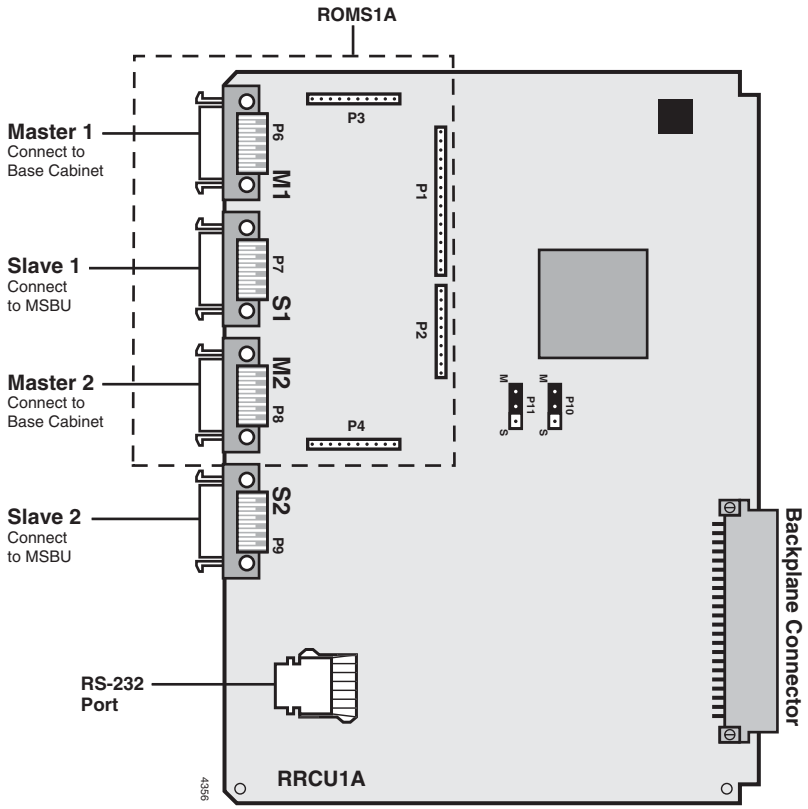
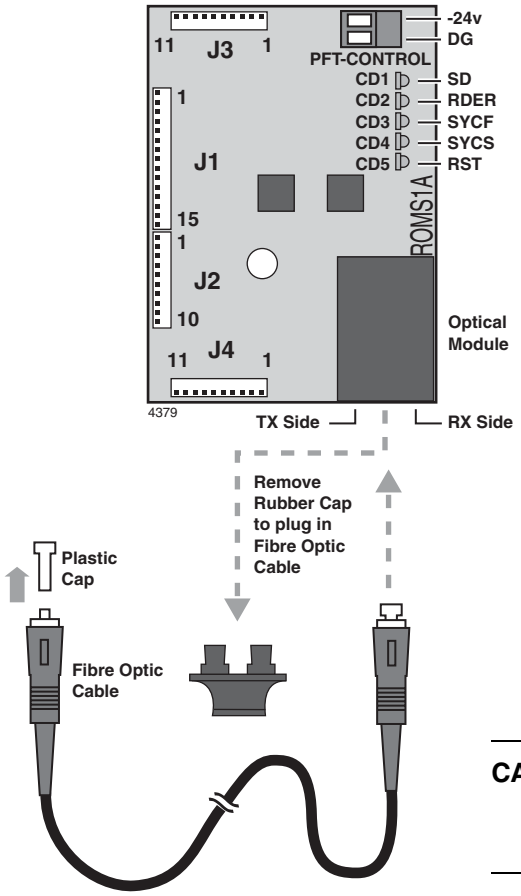


Figure 3-32 Remote Expansion Cabinet Printed Circuit Board (RRCU1A)

Table 3-7 RRCU Controls

Control/Indicator/Connector	Type of Component	Description
Jumper Plug P10	3-terminal Jumper Plug	Master Mode (M connections)
Jumper Plug P10		Slave Mode (S connections)

The ROMS subassembly and fibre optic cable connectors is shown in Figure 3-33. Table 3-8 lists the fibre optic cable specifications.



CAUTION! Inserting the fibre connector at an angle or too forcefully can cause damage.

Figure 3-33 ROMS1A Subassembly

Table 3-8 fibre Optic Specification

Item	Specification
Transmission Speed	155.52 Mbps
Optical Source	LED, 1300 nm
Fibre Type	Multi-mode, Graded Index Fibre (GIF)
Core Diameter	62.5 micrometers
Cladding Diameter	125 micrometers
Connector Type	SC (2-pin transmit and receive)
Maximum Fibre Length	3 km (500~1000 MHz/km fibre) 2 km (200~400 MHz/km fibre)
Optical Budget (Loss)	9 dB (one way)
Minimum Bend Radius	30 mm
Round Trip Delay Time	30 micro seconds.
Transmit Power	>= -23.5 dBm
Receiver Sensitivity	<= -30 dBm

The fibre connection must conform to both the Optical Budget and Fibre Length specifications. It is possible to have a fibre connection longer than 3 km (1.86 miles) with less than 9 dB of loss; however, the CTX670 Remote Expansion Cabinet is sensitive to signal delay and cannot be guaranteed to operate at distances greater than 3 km (1.86 miles).

Status Indicators

The RRCU1A card set provides two status indicators: a set of LEDs on the ROMS1A card and an RS232C Monitor Port on the RRCU1A. Status indications are provided according to Tables 3-9 and 3-10. Binary Code Output is generated upon change of a reported condition.

Table 3-9 RS-232C Binary Code Output

BIT	Label	Function	Normal Condition
D0	SD	1: Optical signal not detected 0: Optical signal detected	0
D1	RDER	1: Code rule violation detected in received data 0: Code rule violation not detected in received data	0
D2	SYCF	1: Frame synchronisation of received data not established 0: Frame synchronisation of received data established	0
D3	SYCS	1: System synchronisation between cabinets not established 0: System synchronisation between cabinets established	0
D4	RST	1: Reset signal from CTU detected 0: Reset signal from CTU not detected	0
D5		Not Used	0
D6		Not Used	1
D7		Not Used	0

Table 3-10 LED Status Indications

LED	Function	Normal Condition
PWR	Blinking: Power is supplied Off: Power is not supplied	Blinking
SD	On: Optical signal not detected Off: Optical signal detected	Off
RDER	On: Code rule violation detected in received data Off: Code rule violation not detected in received data	Off
SYCF	On: Frame synchronisation of received data not established Off: Frame synchronisation of received data established	Off
SYCS	On: System synchronisation between cabinets not established Off: System synchronisation between cabinets established	Off
RST	On: Reset signal from CTU detected Off: Reset signal from CTU not detected	Off

Monitor Port Communication Parameters

Data rate: 9600 bps

Data word bits: 8

Parity: None

Stop bits: 1

Monitor Port Pin Assignments

The monitor port pin connection and pin assignments are shown in Figure 3-34.

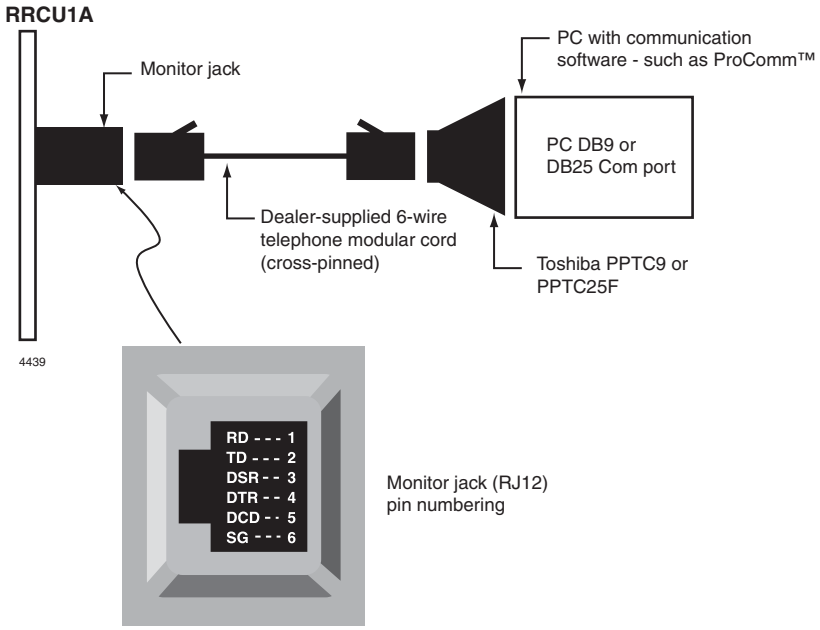


Figure 3-34 RRCU1A Monitor Jack

PCB Installation 4

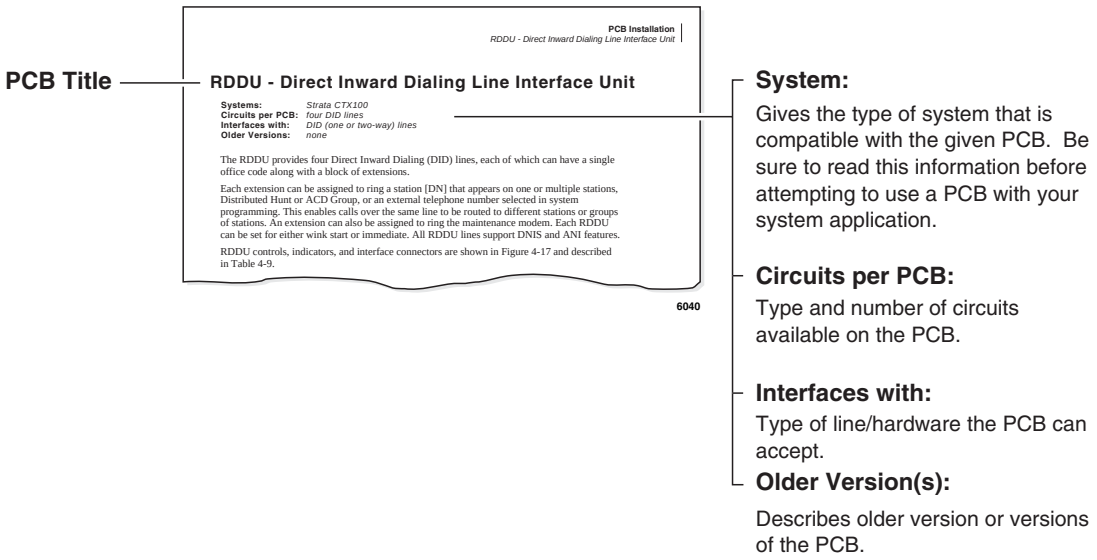
This chapter contains information on Printed Circuit Boards (PCBs) which can be used in the cabinet slots of the Strata CTX systems.

Note Prior to PCB installation, the power supply must be tested and the ground checked.

PCB Chapter Layout

Each PCB outline begins with the PCB's designation and title (the outline appears in the chapter in alphabetical order by designation). A brief synopsis of the PCB appears next and includes a notation of the system(s) that the PCB can be used in, the circuits supplied by the PCB, what equipment the PCB interfaces with, and a list of the PCB's older version(s) with a brief description of their differences.

Installation instructions follow the synopsis with a table showing the PCB's controls, indicators and connectors and an illustration of the board.



PCB Hardware/Software Options

PCBs can be configured for a variety of hardware and software options. Hardware options are defined as either internal (generally related to optional PCB subassemblies) or external (related to connection of peripheral equipment, such as background music, voice mail, etc.). Hardware and software options for each PCB are identified in the individual PCB installation procedures in this chapter.

PCB Hardware Options

Each PCB must be configured for the applicable hardware options prior to installation of the PCB. Configuration instructions for internal hardware options are provided in the individual PCB installation procedures in this chapter and Chapter 6 – MDF PCB Wiring. Configuration instructions for external hardware options are provided in Chapter 8 – Peripheral Installation.

PCB Software Options

After installation of the PCBs in the KSU, configure the PCBs for software options through programming. Refer to the *Strata CTX Programming Manual* for more detailed programming instructions.

CTX100 ACTU Processor PCBs

System: *Strata CTX100 Base Cabinet*
Current Version: *ACTU1F*
Older Version(s): *None*

For information about the CTX100 ACTU processor, see "CTX100 Processor" on Page 1-2 and "Set Jumpers and Install Option PCBs onto the ACTU" on Page 2-17.

CTX670 BECU/BBCU Processor PCBs

System: *Strata CTX670 Base Cabinet*
Current Version: *BECU1F/BBCU1F*
Older Version(s): *None*

For information about the BECU/BBCU CTX670 processor PCBs, see "CTX670 Processor PCBs" on Page 1-5 and "BECU/BBCU Installation" on Page 3-36.

PCB Installation Power Supply Considerations

WARNING! The power supply must be Off whenever removing or installing the processor PCBs (see Figure 2-15 on page 2-16 and Figure 3-3 on page 3-9).

It is recommended that the power supply be Off, whenever possible, when removing or installing the other PCBs.

ADKU – Digital Telephone Interface Unit

Circuits per PCB: *eight digital telephone circuits*
Interfaces with: *all Toshiba digital telephones (DDCB, DSS, ADM, BPCI)*
Older Version(s): *none*

ADKU Hardware Options

The ADKU digital telephone interface unit only works with the CTX100. Refer to Chapter 7 – Station Apparatus for instructions on how to connect digital telephones, DDCBs, and DDSS consoles to the ADKU, as well as how to upgrade digital telephones with these options: a PC Interface Unit (BPCI), a Speaker Off-hook Call Announce upgrade (BVSU), and a Headset/External Speaker (BHEU).

ADKU Installation

➤ Insert the ADKU (component side facing right) into the appropriate slot, and apply firm, even pressure to ensure proper mating of connectors.

ASTU – Standard Telephone Interface Unit

Circuits per PCB: *two single line telephone circuits*
Interfaces with: *Standard two-wire devices*
Older Version(s): *none*

ASTU Installation

Cabinet Slot

CTX100 has flexible 8 slots (Base:S101-S104 and Expansion:S105-S108). ASTU is configured with reserved (fixed) slot of S109.

Table 4-1 ASTU PCB

Standard Telephone Interface Unit (ASTU1)	
Provides two standard telephone circuits.	Interface with: Standard telephones (No message waiting) Other single-line devices Alternate BGM source Fax machine Voice mail devices

Table 4-2 ASTU Electrical Characteristics

ASTU	
Ring Voltage	Square wave 190 250V peak-to-peak (no-load)
Ringing Capacity	2 REN maximum per circuit

The figure below shows where to install the ASTU on the CTX100 Base cabinet. Table 4-3 shows the interface connectors.

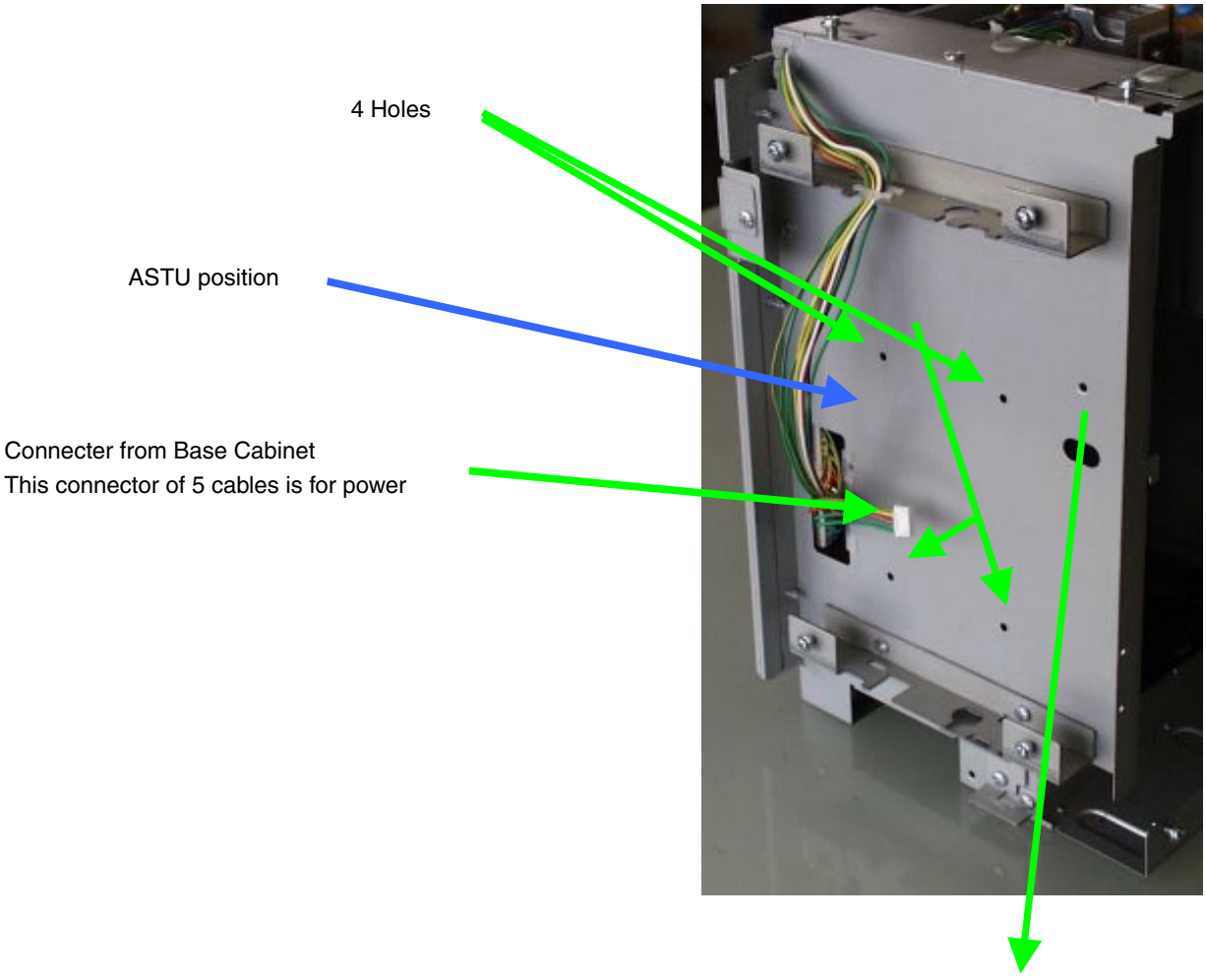


Figure 4-1 ASTU Installation

Note Important safety information is detailed in the chapter ‘Notes to Users’ at the end of this manual.

Table 4-3 ASTU Interface Connectors

Connector	Type of Component	Description
Connector cable P1	5 wire cable	Connects to the motherboard for supply power
Connector cable P2	10 wire cable	Connects to the processor PCB for data and signal highway
J1, J2	RJ11	Interface with single line devices
FG 1	Green wire	Protection from hazardous voltage

BDKU/BDKS – Digital Telephone Interface Unit

Circuits per PCB: *eight digital telephone circuits (plus eight more with the BDKS PCB)*
Interfaces with: *all Toshiba digital telephones (DDCB, DSS, ADM, BPCI)*
Older Version(s): *none*

BDKU Hardware Options

BDKU can be equipped with a BDKS piggyback PCB to provide a total of 16 circuits. Refer to Chapter 7 – Station Apparatus for instructions on how to connect digital telephones, DDCBs, and DDSS consoles to the BDKU/BDKS, as well as how to upgrade digital telephones with these options: a PC Interface Unit (BPCI), a Speaker Off-hook Call Announce upgrade (BVSU), and a Headset/ External Speaker (BHEU). The BDKU can be installed alone, or with the BDKS subassembly.

BDKS

The BDKS can be installed onto the BDKU to add eight more digital telephone circuits.

➤ **To install the BDKS**

➤ Match the BDKS connectors to the BDKU, as shown in Figure 4-3. Press firmly to ensure that the connectors are snug.

BDKU Installation

1. Set the BDKU/PDKU switch for the appropriate system (refer to Figure 4-3 and Table 4-4).
2. Insert the BDKU2 (component side facing right) into the appropriate slot, and apply firm, even pressure to ensure proper mating of connectors. Refer to "Strata CTX670 Cabinet Slot Configuration" on Page 1-23 to ensure the BDKU is in a suitable slot.
3. Install the Ferrite Core (comes with the BDKU) onto the 25-pair cable that connects the BDKU to the MDF: Flip open the two snaps on the Ferrite Core, then snap it shut around the BDKU cord as shown in Figure 4-2. The core must be as close as possible to the BDKU.

   The core is needed to comply with EU requirements.
4. Some Ferrite Cores require a tie-wrap at the bottom to keep it from sliding. For those, feed the tie-wrap through the slots in the Ferrite Core, then cinch it.

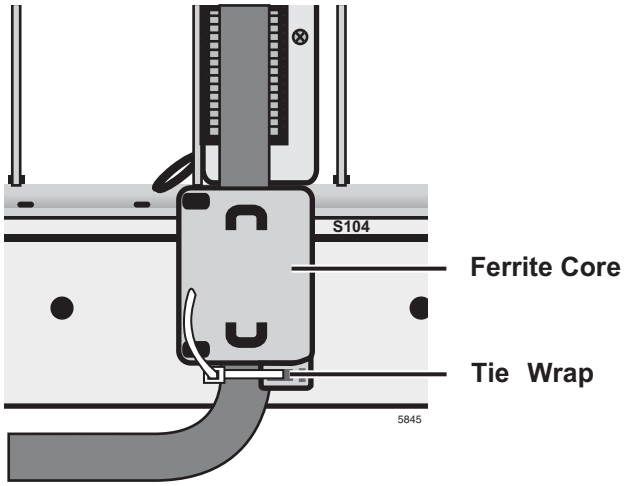


Figure 4-2 BDKU Ferrite Core

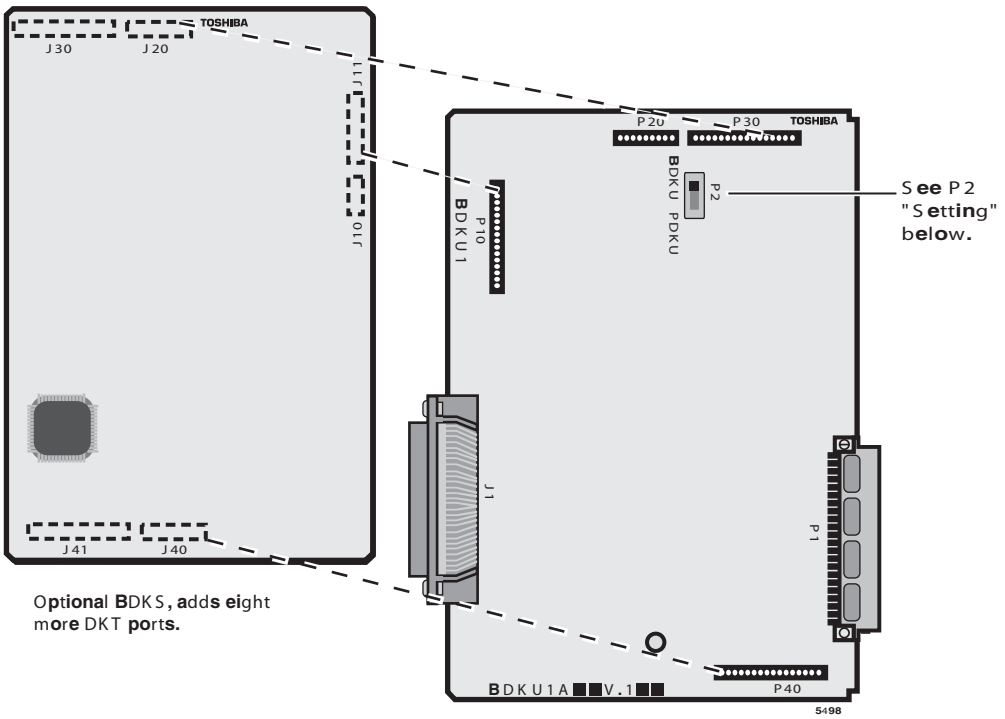


Figure 4-3 BDKU/BDKS PCB

Table 4-4 BDKU Controls, Indicators, and Interface Connectors

Control/Indicator/Connector	Type of Component	Description
P2	BDKU/PDKU Jumper Plug	Strata CTX: set P2 to BDKU for all slots to enable: 3000-series telephone features and buttons and the BDKS to be operational. Strata DK/CT: set P2 to PDKU for all slots: All DK Cabinet slots (BDKS does not function on the Strata DK/CT) If the switch is set to the PDKU mode, the DKT3000-series telephone LCD will be 16 characters,and the **Spdial** and LCD **Feature** buttons will not work.

BIOU – Option Interface Units

Circuits per PCB: *(see interfaces)*
Interfaces with: *three music-on-hold sources, system page and control relays*
Older Version(s): *none*

The BIOU provides a Paging Output (amplified and non-amplified), four zone paging relays, three Music-on-hold (MOH) interfaces and four control relays (Night Transfer, Night Bell and Background Music (BGM) mute). One or two BIOUS can be installed in a Strata CTX.

BIOU controls, indicators, and interface connectors are shown in Figure 4-4 and described in Table 4-5.

BIOU Installation

➤ Insert the BIOU (component side facing right) into any available PCB slot in the cabinet. See "Strata CTX670 Cabinet Slot Configuration" on Page 1-23. Apply firm, even pressure to ensure proper mating of connectors.

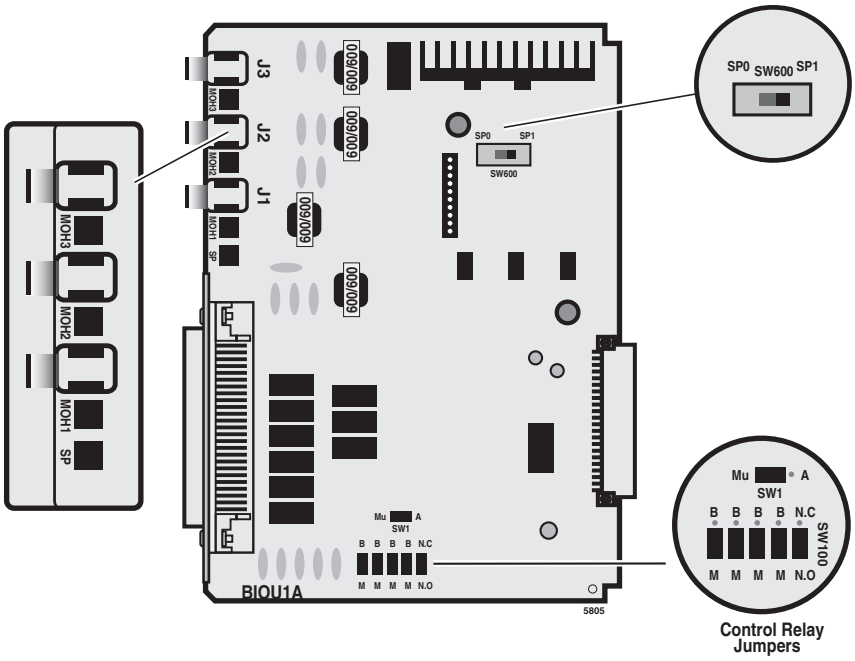


Figure 4-4 BIOU PCB

Table 4-5 BIOU Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
SW600	Page Output Switch	SP0=600 ohms. SP1 = 3-watt amp.
J1, J2, J3	RCA jack for connecting MOH/BGM source	Interface connector for MOH/BGM source 1, 2, or 3.
MOH1, MOH2, MOH3	Screwdriver volume control	Adjusts volume of respective MOH jacks 1, 2, and 3.
SP	Screwdriver volume control	Adjusts volume of SP1; 3-watt page amplifier.
B/M	Break/Make control relay jumpers	Set in the Make (close) or Break (open) position, depending upon which one should occur when the application relay activates.
N.C/N.O	Jumper plug	Not used.
SW1 Mu/A	Jumper plug	Select A law for U.K.

BVPU – Internet Protocol (IP) Interface Unit

Circuits per PCB: *four Tie line circuits; one 10BaseT Ethernet connection*

Interfaces with: *H.323 version 2 terminals over an IP network*

Appears as: *4 E&M Tie lines*
2- or 4-wire transmission
Type I and II Signalling
Immediate and Wink Start

Older Version(s): *none*

BVPU Configuration

BVPU controls, indicators, and interface connectors are shown in Figure 4-5 and described in Table 4-6.

BVPU Installation

1. Insert the BVPU (component side facing right) into the appropriate slot and apply firm, even pressure to ensure proper mating of connectors.
2. Attach the 10BaseT Ethernet connection to the LAN connector.
3. Connect a PC equipped with Maintenance Console Software (MCS) to the serial port according to the drawing below. A serial connection is necessary to establish the IP address of the BVPU. Once the IP address is established, maintenance may be conducted over the Ethernet port.
4. After installing the BVPU, gently pull it outward. If the connectors are properly mated, a slight resistance is felt.

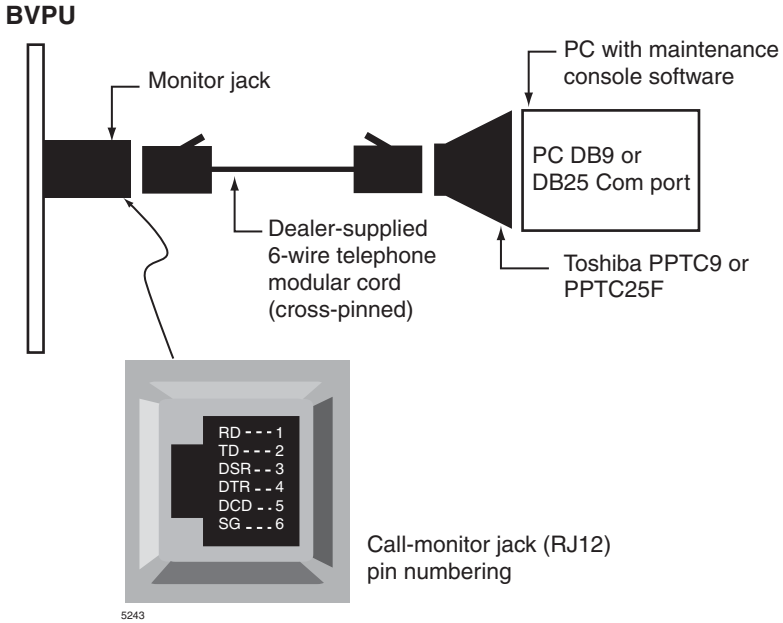


Figure 4-5 BVPU Monitor Jack

Table 4-6 BVPU Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Serial Port		RS-232C maintenance connection
LAN Connector	RJ45	10BaseT ethernet connection
SW0	DIP Switch	Unused. All switches = Off
LED 1	Green LED	On = Tie trunk 4 active
LED 2	Green LED	On = Tie trunk 3 active
LED 3	Green LED	On = Tie trunk 2 active
LED 4	Green LED	On = Tie trunk 1 active
LED 5	Green LED	Power On/Off
LED 6	Yellow LED	Line Status (On=Busy / Off = Idle)
LED 7	Red LED	Alarm (On = Abnormal)
LED 8	Green LED	On-Line
		On = Operating
		Off = Starting up or Off
		Slow Flash = Detected error in BVPU
		Fast Flash = Shut down mode
LED 9	Yellow LED	Link Indication (On = Normal)
LED 10	Green LED	Data (On = Data communication in progress)
LED 11	Yellow LED	Collision (On = collisions occurring)

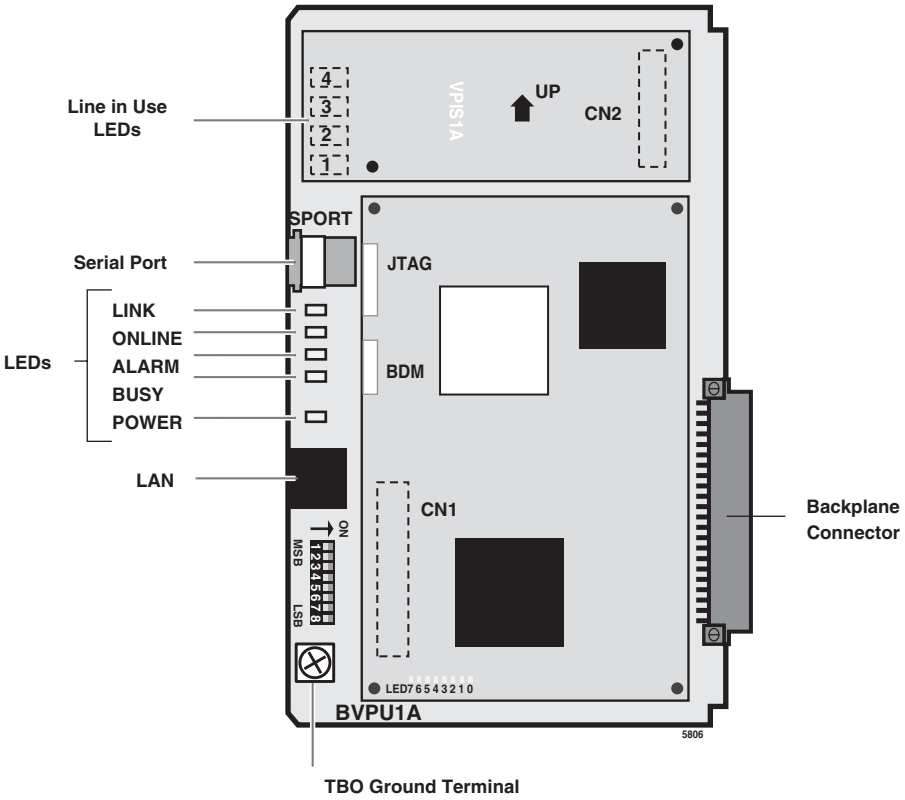


Figure 4-6 BVPU PCB

PDKU2 – Digital Telephone Interface Unit

Circuits per PCB: *eight digital telephone circuits*

Interfaces with: *digital telephones (with or w/o ADM) (See Notes under Hardware Options)DDSS console (circuit 8 only)*
DKT2001 single line digital telephones

Older Version(s): *None*

PDKU2 Hardware Options

PDKU2 does not have to be configured for any option. Refer to Chapter 7 – Station Apparatus for instructions on how to connect digital telephones, DADMs, and DDSS consoles to the PDKU2. Refer to Chapter 8 – Peripheral Installation for instructions on connecting Door Phones (DDCBs).

Notes

- BPCI, RPCI-DI and PDIU-DI are *not* supported on Strata CTX.
- With the DKT3000/3500-series telephones, limitations are 16 (not 24) character LCD display, **Spdial** and LCD **Feature** buttons don't work and the BPCI cannot be used

There are no controls or indicators on the PDKU (Figure 4-7).

PDKU2 Installation

1. Insert the PDKU2 (component side facing right) into the appropriate slot, and apply firm, even pressure to ensure proper mating of connectors.
2. After installing the PDKU, gently pull the PCB outward. If the connectors are properly mated, a slight resistance is felt.

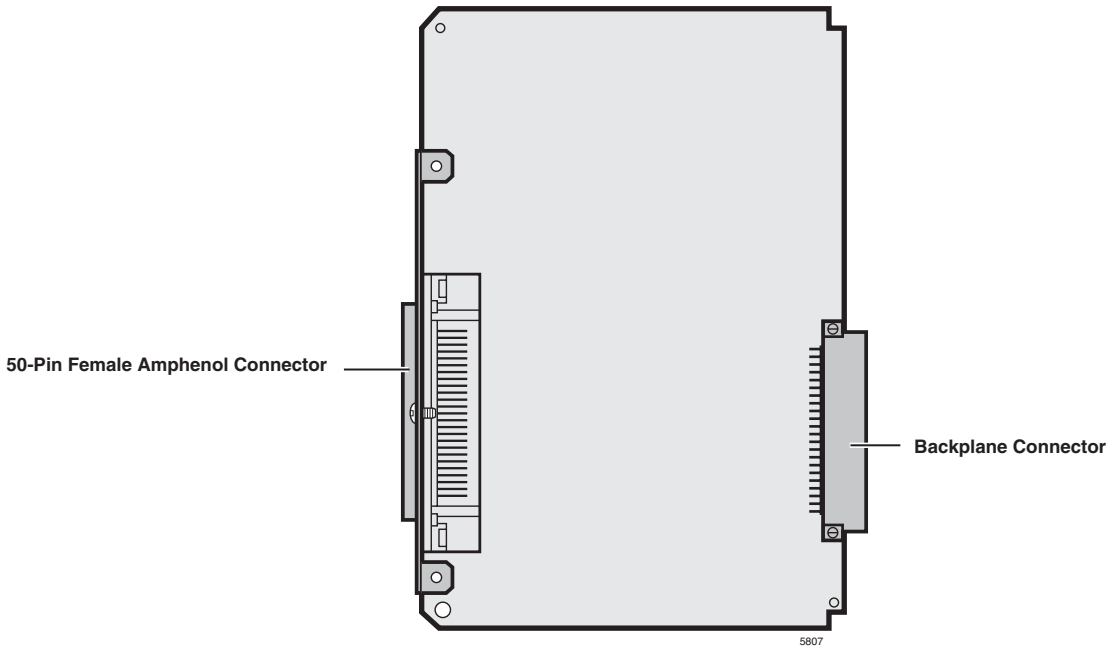


Figure 4-7 PDKU2 PCB

RSTU3 – Standard Telephone Interface Unit

Circuits per PCB: *eight standard telephone circuits*

Interfaces with: *standard telephones*
voice mail ports
off-premises stations
other similar devices
alternate BGM sources
auto attendant digital announcer
message waiting lamp

Older Version(s): *RSTU1–80-VRMS sine wave ring generator, optional R48S unit increases the loop voltage from -24VDC to -48VDC, extending the loop length (including the resistance of the phones from 600 ohms to 1200 ohms.*
PSTU–190V P-P or 130V P-P W1 jumper

Only one telephone (or device) can be connected to a RSTU3 port. If more than one telephone or device is connected to a port, ringing or message waiting may not function. RSTU3 only provides a 90-volt square wave message waiting generator to drive standard telephone 90V message waiting lamps.

Notes

- For the system to recognise the DTMF tones generated by a standard telephone (or any other device connected to a standard telephone port), a DTMF Receiver Unit (RRCS -4, -8, or -12) must be installed on the processor PCB.
- Most standard telephones and two-wire devices require the 190V P-P level; however, some devices may experience ring-trip with 190V P-P and should be set for 130V P-P.

R48S -48 Volt Supply Installation (Internal Option)

➤ Mate the R48S connectors P6 and P7 (Figures 4-8~4-10) with the R48S connectors P6 and P7 on the RSTU or RSTU3.

Note RSTU connectors P6 and P7 are positioned so that the R48S only fits in the proper position.

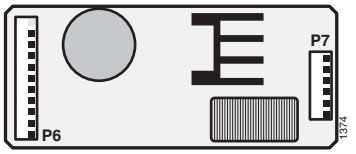


Figure 4-8 R48S Interface Connectors

External Options

W1 Ring Generator Switch Configuration (PSTU1 and PSTU2)

➤ On the PSTU1 or PSTU2, ensure the W1 switch is set to the “H” (190V P-P) position for initial installation. The “L” (130V P-P) position is used if devices connected to the PSTU1 or PSTU2 experience ring trip.

Standard Telephone Message Waiting Lamp Control

No steps required here.

RSTU Installation

1. Make sure the factory-installed SRSS subunit is securely attached to the RSTU (Figures 4-9 and 4-10).

WARNING! The shield on the back of the RSTU3 is designed to protect you from potentially hazardous ring voltage. Do NOT remove this shield.

2. Insert the RSTU (component side facing right) into the appropriate slot, and apply firm, even pressure to ensure proper mating of connectors.
3. After installing the RSTU, gently pull the RSTU outward. If the connectors are properly mated, a light resistance is felt.

Note When installing the RSTU3 into an existing system, system power must be cycled only if the MW mode (P11) is changed.

Table 4-7 RSTU3 Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Ring voltage W1 jumper (PSTU1 (V.4) and PSTU2 only)	3-terminal jumper	Sets ring generator voltage level for all circuits. H=190V P-P, L=130V P-P.
R48S connector P6 (RSTU)	9-pin connector	Interface connector to P6 of R48S.
R48S connector P7 (RSTU)	6-pin connector	Interface connector to P7 of R48S.
Mu/A P10 (RSTU3 only)	3-terminal jumper	Mu Law or A Law PCM companding. (Must be set to A Law.)
MW (Message Waiting) Mode P11 (RSTU3 only)	3-terminal jumper	CON = Electronically controlled message waiting light (U.S. and Canada). NOR = Relay controlled message waiting light. Do not use this in the U.S. and Canada since this option may cause message waiting cross-talk noise in some installations.

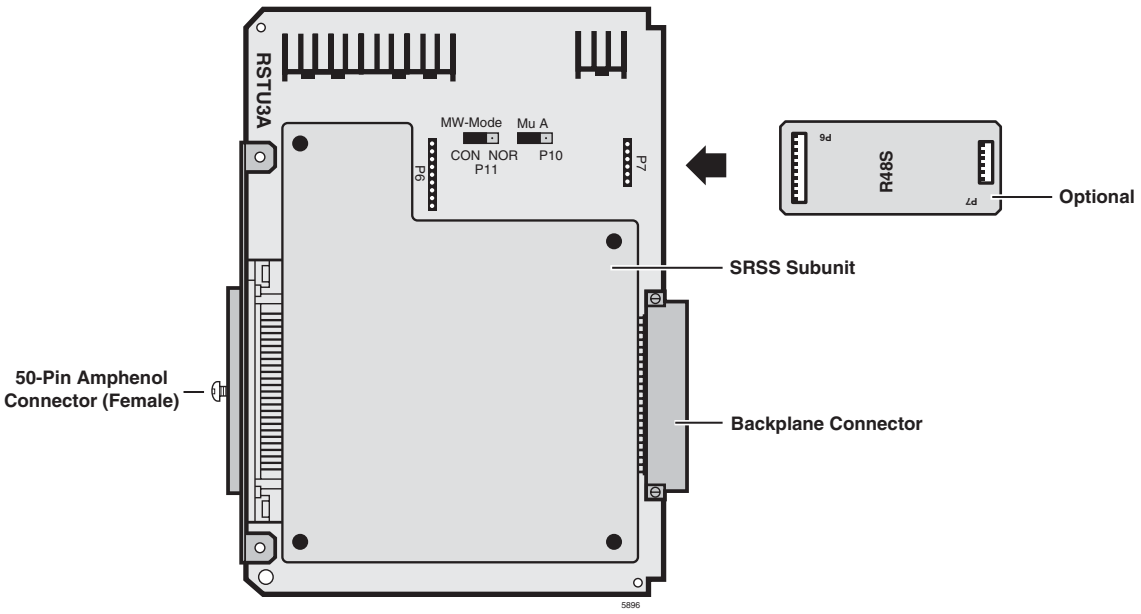


Figure 4-9 RSTU3 Controls and Interface Connectors

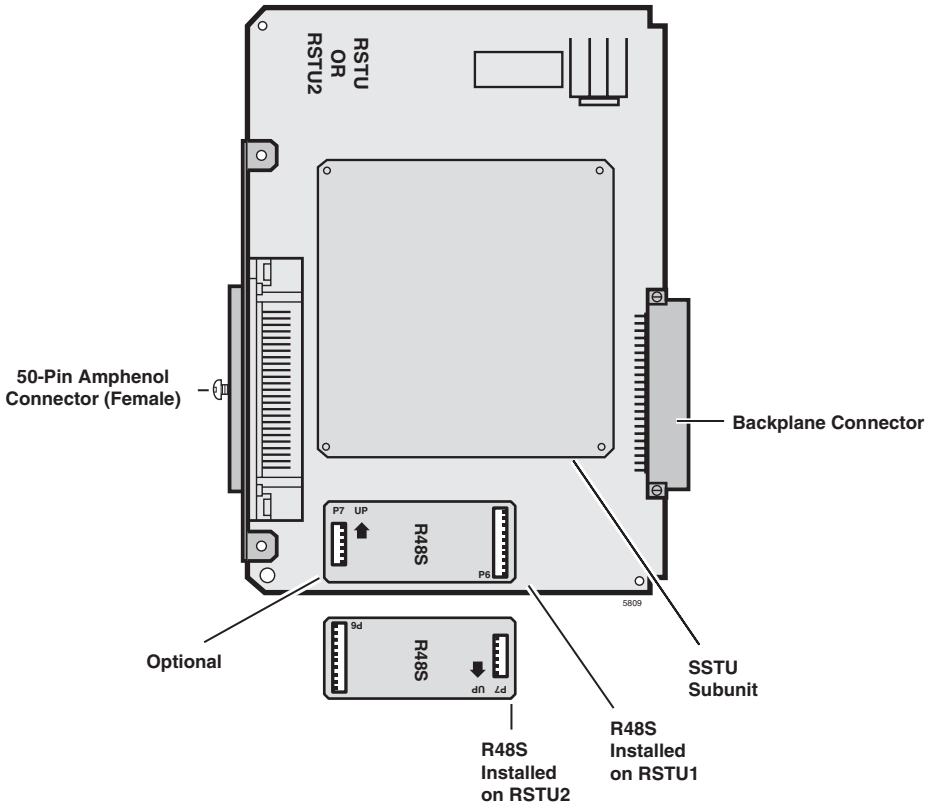


Figure 4-10 RSTU or RSTU2 Controls and Interface Connectors

RCOU3F, RCOS3F – Four-Circuit Loop Start Exchange Line Interface Unit

Circuits per PCB: *four loop start Exchange line circuits*
Interfaces with: *loop start lines*
Older Version(s): *PCOU2F*

The RCOU3F and RCOU provide ring detection, dial outpulsing, and hold circuitry. Each RCOU line can be programmed for DTMF or dial pulse signalling and has surge absorbers for secondary protection.

The RCOU3F and RCOU PCBs are shown in Figures 4-13 and 4-14 and described in Table 4-9.

RCOS Installation (Internal Option)

An RCOS3F PCB can be installed on the RCOU3F for four more loop start lines (for a total of eight lines–the RCOS circuits provide the same options as the RCOU). Each RCOS circuit has surge absorbers for secondary protection.

Excessive loudness which is caused by close proximity to an Exchange or PBX telephone can be fixed through the RCOS and RCOU decibel (dB) Pad switches. RCOS dB switches SW501, SW601, SW701, and SW801 and RCOU dB switches SW101, SW201, SW301, and SW401 provide a -3 dB signal level drop between the PBX and Exchange when set to position 3. Switches are factory-set at the 0 (0 dB signal level drop) position.

The RCOS3F PCB is shown in Figures 4-11 and 4-12 and described in Table 4-8.

➤ **To install an RCOS3F PCB**

1. If the Strata CTX system is within one mile of the PBX or Exchange, set the RCOS dB Pad switches SW501, SW601, SW701, and SW801 to the 3 (-3 dB signal level drop) position. Set the RCOU dB Pad switches to position 3 also.

Note RCOU male connectors P11, P12, P13, and P14 are positioned to allow installation of the RCOS only in the proper position.

2. Mate the RCOS3F female connectors J11, J12, J13, and J14 (Figure 4-11) to the RCOU3F male connectors P11, P12, P13, and P14 (Figures 4-13 or 4-14).
3. (RCOS3F only) For Mexico, the U.K, or Asia, insert the short jumper plug on the A Law side. For the U.S. and Canada, no plug is required. (No plug is the Mu Law assignment).
4. Apply firm, even pressure to the RCOS to ensure proper mating of connectors.

Table 4-8 RCOS3F Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Exchange line circuit 5~8 indicators	Red LED	Lights to indicate that line circuit is in operation. (Exchange line indicator will not light unless RCOU is connected to a Exchange line).
J3 connector	Modular connector	Interface connector for Exchange line circuits 5 and 6.
J4 connector	Modular connector	Interface connector for Exchange line circuits 7 and 8.
Pad switch SW501 (circuit 5)	2-position slide switch	Enables -3dB signal level drop for Exchange line circuit.
Pad switch SW601 (circuit 6)		
Pad switch SW701 (circuit 7)		
Pad switch SW801 (circuit8)		
RCOU3F connector J11, J12, J13, J14	11-pin female connector	Interface connector for RCOU3F. RCOS3Fcan be connected with RCOU3F.
Mu Law/A Law jumper plug P2	3-terminal jumper	No jumper plug is the default for the U.S. and Canada. For countries requiring A Law, insert the jumper plug (provided in the PCB box) on the A Law side.

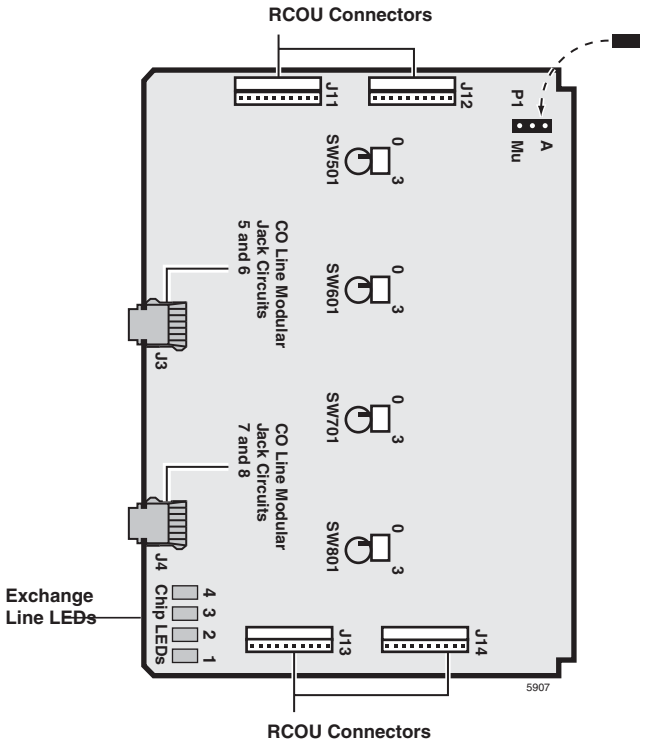


Figure 4-11 RCOS3F PCB

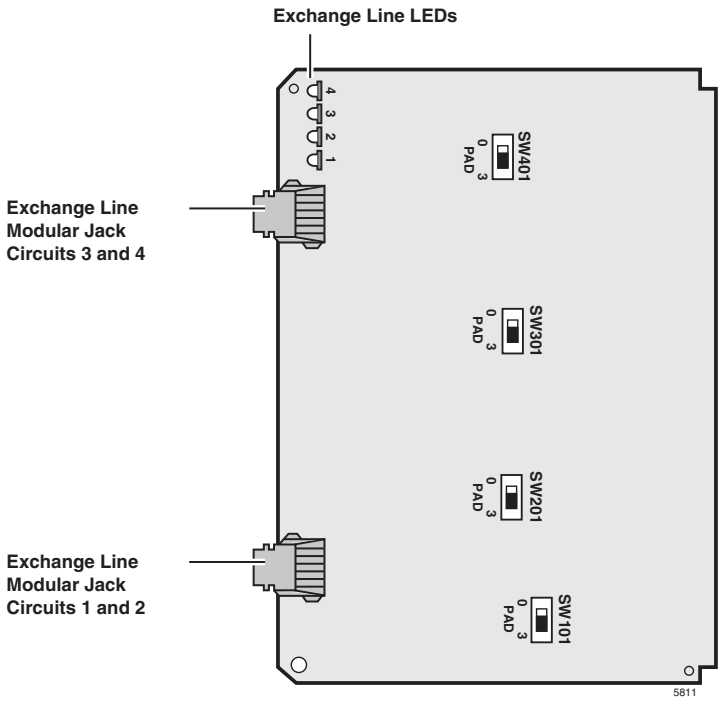


Figure 4-12 RCOS PCB

RCOU Installation

Note The decibel (dB) Pad switches SW101, SW201, SW301, and SW401 control excessive loudness resulting from close proximity to an Exchange Line or PBX telephone office by providing a -3 dB signal level drop to, or from, the PBX or Exchange Line when set to the 3 position. Switches are factory-set to the 0 (0 dB signal level drop) position.

➤ **To install an RCOU3F PCB**

1. If the Strata CTX system is within one mile of the PBX or Exchange Line, set the RCOU dB Pad switches SW101, SW201, SW301, and SW401 to the 3 (-3 dB signal level drop) position.
2. (RCOU3F only) For Mexico, the U.K, or Asia, insert the short jumper plug on the A Law side. For the U.S. and Canada, no plug is required. (No plug is the Mu Law assignment).
3. Insert the RCOU (component side facing right) into the appropriate slot and apply firm, even pressure to ensure proper mating of connectors. PCOU2 can be installed in place of RCOU, see the appropriate Configuration chapter.
4. After installing the RCOU, gently pull the PCB outward. If the connectors are properly mated, a slight resistance is felt.

Table 4-9 RCOU3F Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Exchange line circuit 1~4 indicators	Red LED	Lights to indicate that line circuit is in operation. (Exchange line indicator will not light unless RCOU is connected to a Exchange line).
J1 connector	Modular connector	Interface connector for Exchange line circuits 1 and 2.
J2 connector	Modular connector	Interface connector for Exchange line circuits 3 and 4.
Pad switch SW101 (circuit 1)	2-position slide switch	Enables -3dB signal level drop for Exchange line circuit.
Pad switch SW201 (circuit 2)		
Pad switch SW301 (circuit 3)		
Pad switch SW401 (circuit 4)		
RCOS connector P11, P12, P13, P14	10-pin male connector	Interface connector for RCOS 4-circuit loop start Exchange line unit.
Mu Law/A Law jumper plug P2	3-terminal jumper	No jumper plug is the default for the U.S. and Canada. For countries requiring A Law, insert the jumper plug (provided in the PCB box) on the A Law side.

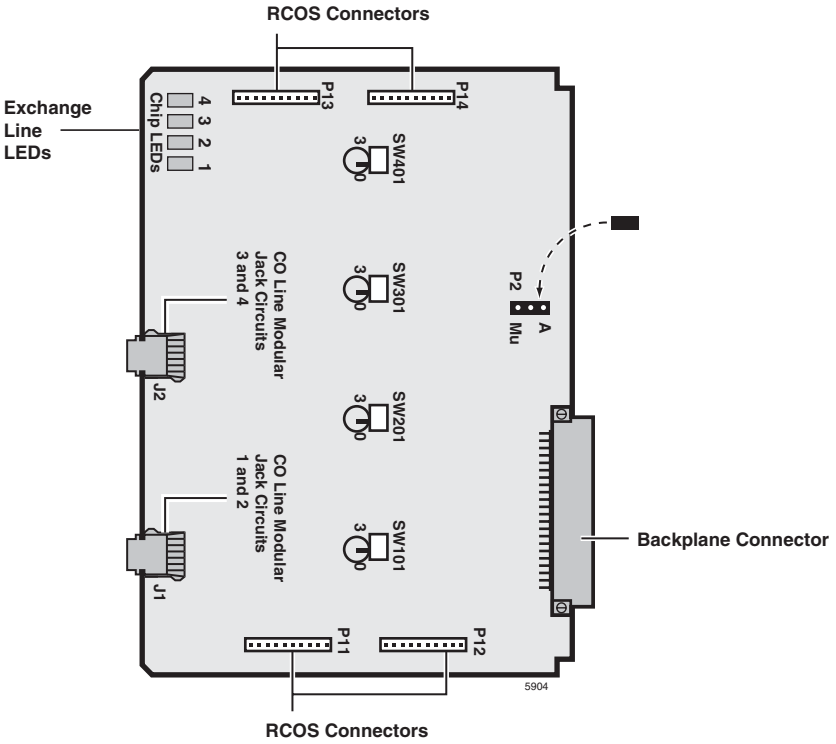


Figure 4-13 RCOU3F PCB

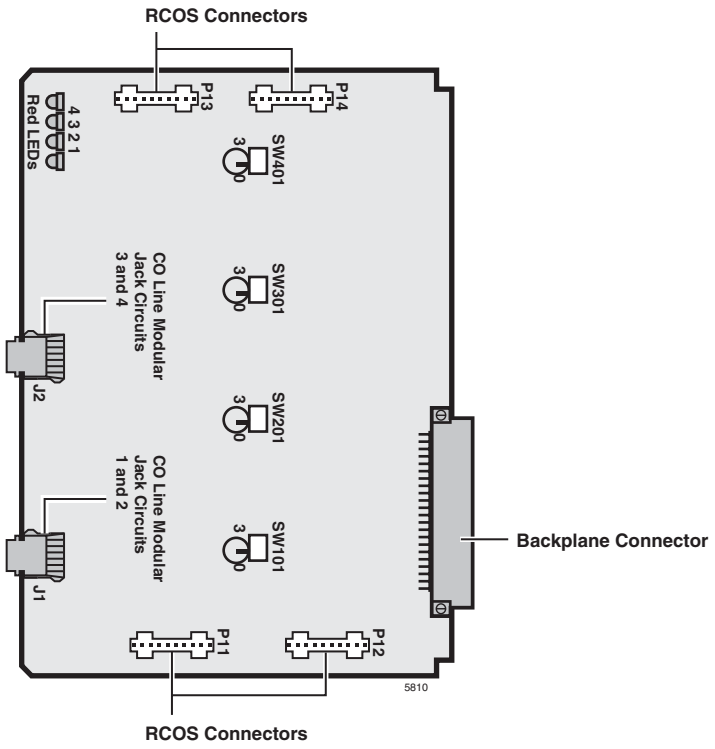


Figure 4-14 RCOU PCB

Table 4-10 PCOU2 Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Exchange line circuit 1 CD112	Red LED	Lights to indicate that line circuit is in operation. Exchange line indicator will not light unless PCOU is connected to a Exchange.
Exchange line circuit 2 CD212		
Exchange line circuit 3 CD312		
Exchange line circuit 4 CD412		
J1 connector	Modular connector	Interface connector for Exchange line circuits 1 and 2.
J2 connector		Interface connector for Exchange line circuits 3 and 4.
Pad switch SW101 (circuit 1)	2-position slide switch	Enables -3dB signal level drop for Exchange line circuit.
Pad switch SW201 (circuit 2)		
Pad switch SW301 (circuit 3)		
Pad switch SW401 (circuit 4)		

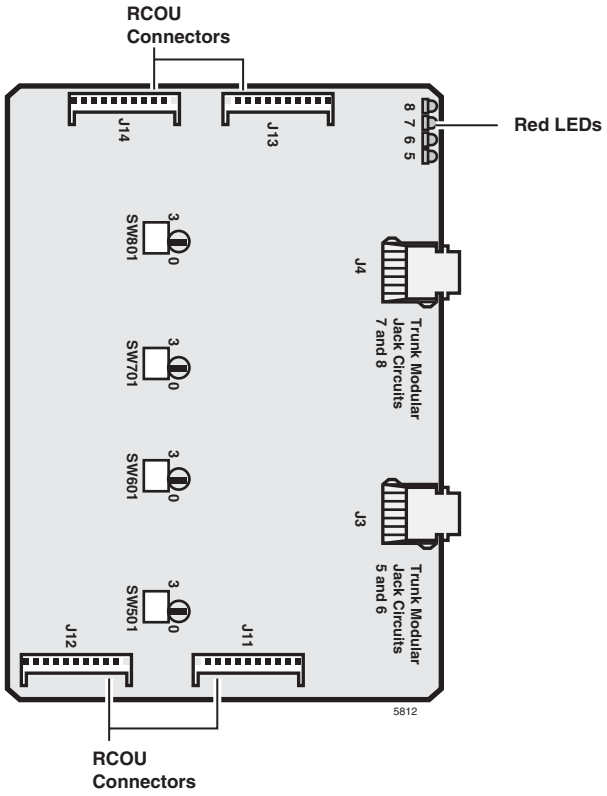


Figure 4-15 PCOU2 PCB

REMU2A – Tie Line Unit

Circuits per PCB: *four Tie line circuits*

Interfaces with: *E&M Tie lines*
2- or 4-wire transmission

Older Version(s): *PEMU*

The REMU2A has four decibel (dB) Pad switches which can be set to reduce excessive loudness resulting from close proximity to an Exchange Line or PBX by providing a -3 dB signal level drop to the PBX or Exchange Line. (Pad is for Transmit and Receive for 2W operation, and Transmit only is for 4W operation.)

REMU2A and REMU controls, indicators, and interface connectors are shown in Figures 4-16, 4-17 and described in Table 4-11.

PEMU controls, indicators, and interface connectors are shown in Figure 4-18 and described in Table 4-12.

REMU2A Installation

1. Set the 2W/4W jumper plugs SW103~SW403 to the appropriate positions.
2. If the system is located within 1.61km (one mile) of the PBX or Exchange Line, set the REMU dB Pad switches SW101, SW201, SW301, and SW401 to the 3 (-3 dB signal level drop) position.
3. Make sure the jumper plugs for P105, P205, P305 and P405 are set to the TYP1,2 (default), unless the unit is used in the U.K. or Japan, in which case the plug should be moved to DC5.
4. Ensure the position of the jumper plug on P2 selects A Law.
5. Insert the REMU (component side facing right) into the appropriate slot and apply firm, even pressure to ensure proper mating of connectors.
6. After installing the REMU, gently pull it outward. If the connectors are properly mated, a slight resistance is felt.

PEMU Installation

1. Determine if the E&M Tie lines will be configured for 2- or 4-wire transmission.
2. Set the 2W/4W jumper plugs P103, P203, P303, and P403 to the appropriate positions.
3. Set the FG jumper plug P3 to the “2-3” position.
4. Set all GND/BAT jumper plugs to the “BAT” position for connection to the telephone network.
5. Insert the PEMU (component side facing right) into the appropriate slot and apply firm, even pressure to ensure proper mating of connectors.)
6. After installing, gently pull the PEMU outward. If the connectors are properly mated, a slight resistance is felt.

Table 4-11 REMU2A and REMU1A Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Tie trunk circuits 1~4 (CD102, 202, 302, and 402)	Red LED	Lights to indicate that Tie line is in operation.
E&M Tie trunk connector circuits 1~4 (J101, 201, 301, and 401)	Modular connector	Interface connector for E&M Tie line circuit.
Pad switch SW101 (circuit 1)	2-position slide switch	Enables -3 dB signal level drop for line circuit.
Pad switch SW201 (circuit 2)		
Pad switch SW301 (circuit 3)		
Pad switch SW401 (circuit 4)		
TYP1/TYP2 jumper plugs P102/ 104	3-terminal jumper	Enables line circuit to be set for Type 1 or Type 2 signalling.
TYP1/TYP2 jumper plugs P202/ 204		
TYP1/TYP2 jumper plugs P302/ 304		
TYP1/TYP2 jumper plugs P402/ 404		
2W/4W switch 102 (circuit 1)	2-position slide switch	Selects 2- or 4-wire configuration for E&M Tie line circuit.
2W/4W switch 202 (circuit 2)		
2W/4W switch 302 (circuit 3)		
2W/4W switch 402 (circuit 4)		
TYP1,2/DC5 jumper plugs P105, P205, P305, P405 (REMU2A only)	3-terminal jumper	For most countries, use the default position (TYP1,2). In the U.K. and Japan, place the jumper plug on DC5.
Mu Law/A Law jumper plug P2 (REMU2A only)	3-terminal jumper	Do not move the jumper plug which is in the default for the U.S. and Canada. For countries requiring A Law, place the jumper plug (provided in the PCB box) on the A Law side.

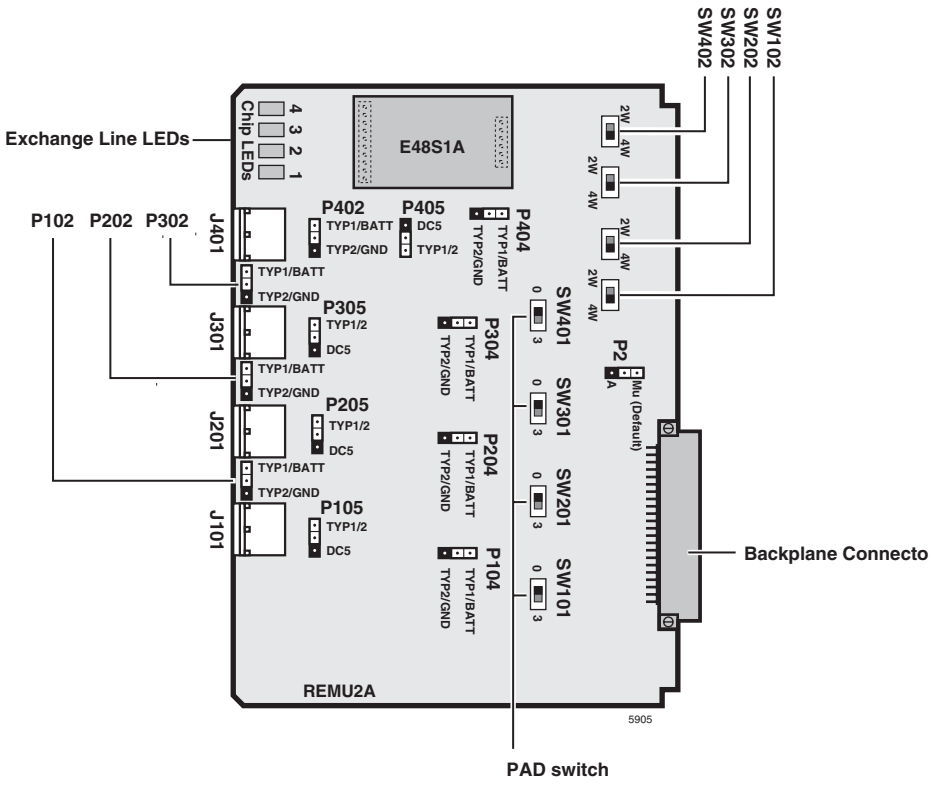


Figure 4-16 REMU2A PCB

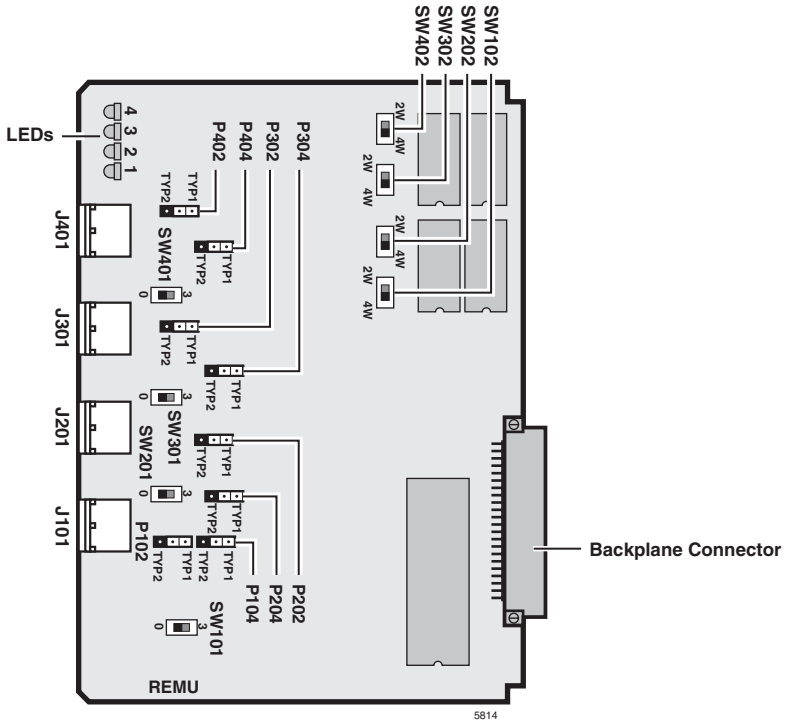


Figure 4-17 REMU PCB

Table 4-12 PEMU Controls, Indicators, and Connectors

Control/Indicator/Connector	Type of Component	Description
Tie trunk circuit 1~4 (CD102, 202, 302, and 402)	Red LED	Lights to indicate that Tie line is in operation.
E&M Tie line connector J101, 201, 301,and 401 (circuit 1~4)	Modular connector	Interface connector for E&M Tie line circuit.
FG jumper P3	3-terminal jumper	Enables or disables -48VDC ground to FG.
GND/BAT jumper P101	3-terminal jumper (Tie line 1)	Enables -3 dB signal level drop for line circuit.
GND/BAT jumper P102		
GND/BAT jumper P201	3-terminal jumper (Tie line 2)	
GND/BAT jumper P202		
GND/BAT jumper P301	3-terminal jumper (Tie line 3)	M-lead origination for Tie line (must be in BAT position per EU requirements.
GND/BAT jumper P302		
GND/BAT jumper P401	3-terminal jumper (Tie line 4)	
GND/BAT jumper P402		
2W/4W switch P103, 203, 303, and 402 (circuit 1~4)	3-terminal jumper	Selects 2- or 4-wire configuration for E&M Tie line circuit.

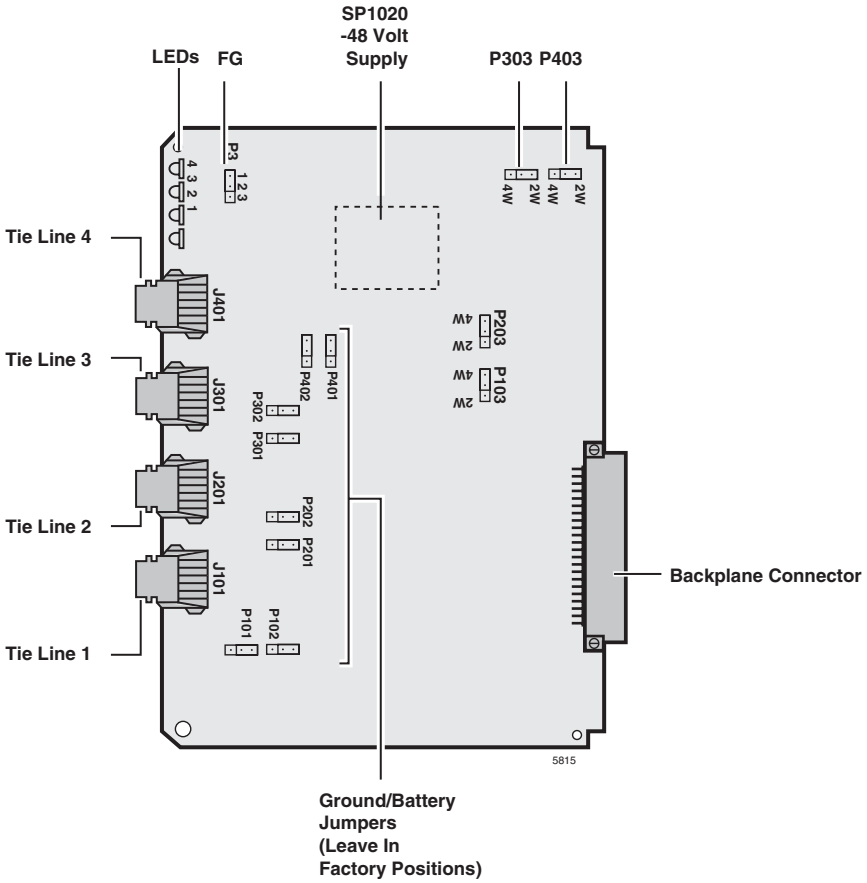


Figure 4-18 PEMU PCB

PACU - AC15 Tie Line Unit

System: *Strata CT and CTX*
Circuits per PCB: *four AC15 tie lines*
Interfaces with: *AC15 'type A' circuits*
Older Version(s): *PACU1*

Each PACU Interface Unit decreases the maximum number of system exchange lines by four.

Each PACU Interface Unit will support four AC15 'type A' tie lines. If the system is connected to another Strata system (or any system in compliance with BTNR181, section 4) the recall feature inherent in AC15 'type C' signalling which allows anti-tromboning will be available.

Note For the system to recognise the DTMF tones generated by incoming TIE lines a DTMF receiver unit (BRCS) must be installed on the Strata CT Processor PCB.

PACU controls, indicators and interface connectors are shown in Figure 4-19 and described in Table 4-13.

PACU Installation

1. Insert the PACU (component side facing right) into the appropriate Expansion cabinet slot and apply firm, even pressure to ensure proper mating of the connectors.

Important! *Each PACU decreases the maximum system exchange lines by four.*

After installing, gently pull the PACU outward. If the connectors are properly mated, a slight resistance is felt.

Table 4-13 PACU controls, indicators and connectors

Control/Indicator/Connector	Type of Component	Description
Tie Trunk Circuit 1~4 (CD101,201, 301 and 401)	Red LED	Lights to indicate status. LED ON = cct busy or faulty. LED OFF = cct idle or operational.
PAD Jumper Wire Circuits 1~4 (W101, 201, 301 and 401)	White Wire Jumper	Enables a -3dB receive signal lexel drop for line circuit.

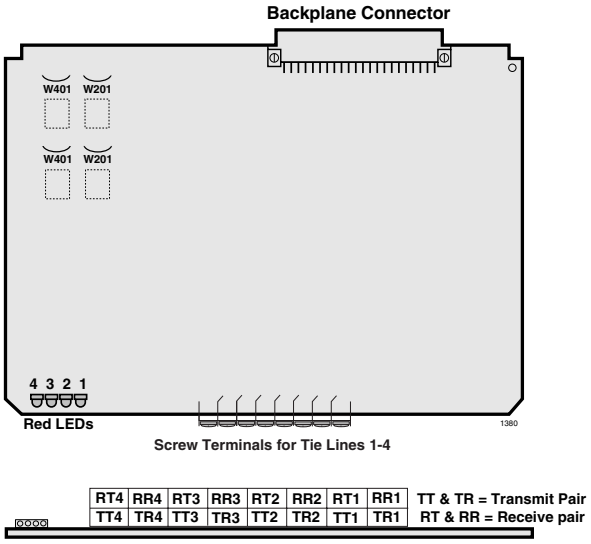


Figure 4-19 PACU Control, Indicator and Interface Connectors

ISDN Interfaces 5

This chapter covers information on the ISDN Primary Rate Interface (PRI) and Basic Rate Interfaces (BRI).

PRI Overview

For PRI services, the Strata CTX uses an RPTU PCB to connect to a Public Switched Telephone Network (PSTN) PRI line. The RPTU PCB is shown in Figure 5-1 on page 5-4.

The Strata CTX also uses the RPTU2 PCB to connect StrataNet QSIG network nodes.

BRI S/T Overview

BRI S/T is available with the RBSU PCB. The RBSU provides two BRI S/T circuits:

- S-type ISDN telephones and Terminal Equipment
- S-type Terminal Adapters

The station-side BRI S/T circuits are point-to-multipoint.

A subassembly (RBSS) can be attached to the RBSU for two additional BRIs for S-type station-side connections only. The RBSU PCB and the RBSS subassembly are shown in Figures 5-9 and Figure 5-10 on page 5-12. The combination of RBSU and RBSS uses only one slot to provide up to four BRI S/T circuits.

Note Each installed RBSU or RBSS circuit provides a 2B + D connection and uses a system capacity of two station ports and two Exchange lines regardless of the circuit application, even if the circuit is not actually connected.

Strata CTX ISDN Reference Model

A block diagram of the Strata CTX ISDN PCBs and reference points is provided in Figure 5-1.

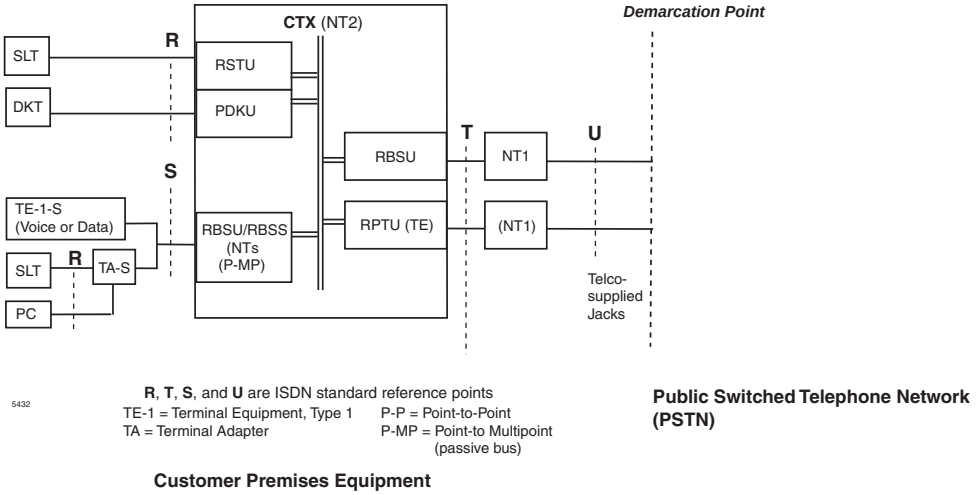


Figure 5-1 ISDN Reference Model

RPTU Interface Unit

Circuits per PCB: *30 channels*
Interfaces with: *ISDN PRI*
Older Version(s): *none*

The RPTU provides 30 channels for ISDN PRI service.

The RPTU's LEDs indicate a continuous status of its operation (see Figure 5-3 and Table 5-2 on page 5-5).

Switches, jumpers, and interface connectors are described in Table 5-1.

RPTU Overview

The RPTU provides 30 B channels and 1 D channel. Each RPTU can also use its own D-channel for control.

The RPTU's in-service bit rate is 2.048 mbps (± 4.6 ppm), but during a maintenance session, the rate may vary ± 32 ppm.

Extracting the LAYER-1 clock from the ISDN PRI service provider is the most common method used to synchronise the RPTU PCB and the CT time switch to the public switched telephone network. One RPTU or RBSU, must extract the clock from the ISDN provider. The selected unit is designated as the "Primary" timing source in system Programming. In remote cabinet applications, the Primary clock source PCB must be installed in the Base Cabinet (main location). For more information, refer to "Timing and Synchronisation" on page 5-21.

Slot Assignments

Up to nine RPTU PCBs can be installed in a Strata CTX system providing up to 264 PRI lines (B-channels). If RPTU (PRI) PCBs are installed, the maximum combined PCBs cannot exceed the eight. The PCBs must be placed in designated slots in each of the cabinets. Refer to Chapter 1 – Strata CTX Configuration, "ISDN PRI Digital Line PCBs" on Page 1-25, for the guidelines regarding RPTU PCB slot assignments.

RPTU Installation

Before installing a RPTU PCB into a Strata CTX system, refer to Chapter 1 – Strata CTX Configuration:

- "Strata CTX670 Cabinet Slot Configuration" on Page 1-23
- "ISDN PRI Digital Line PCBs" on Page 1-25 (mentioned above in slot assignments)

➤ **To install an RPTU PCB**

1. Turn the Strata CTX system power Off.
2. Insert the RPTU (component side facing right) into the appropriate slot (see "ISDN PRI Digital Line PCBs" on Page 1-25) and apply firm, even pressure to ensure proper seating of connectors.
3. After installing the RPTU, gently pull the PCB outward. If the connectors are properly seated, a slight resistance is felt.

Note For cabling information and requirements, refer to "Cabling" on Page 5-6.

Table 5-1 RPTU Switches, Jumpers, and Connectors

Switches/Jumpers/Connector	Description
SW2 (Reset switch)[1]	Resets or initialises the RPTU firmware. Press this switch to correct an out-of-service condition, or just prior to connecting to the Network PRI.
J1 8-pin Modular Connector (RJ45)	Connects the RPTU to the CSU/network PRI ISDN line.
J2 6-pin Modular Connector (RJ11)	Connects the RPTU to a terminal or PC to monitor D-channel data.

1. If this switch on the Primary Clock source RPTU is pressed, the clock source will automatically revert to the Secondary Clock source.

Note The RPTU2 is required for QSIG networking.

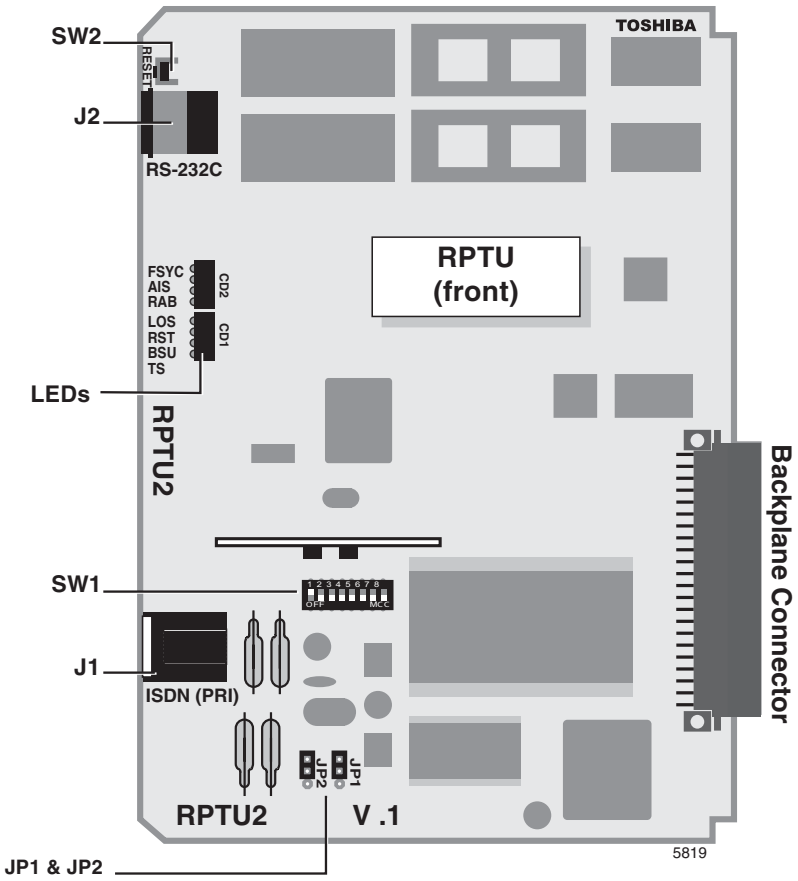


Figure 5-2 RPTU2 PCB

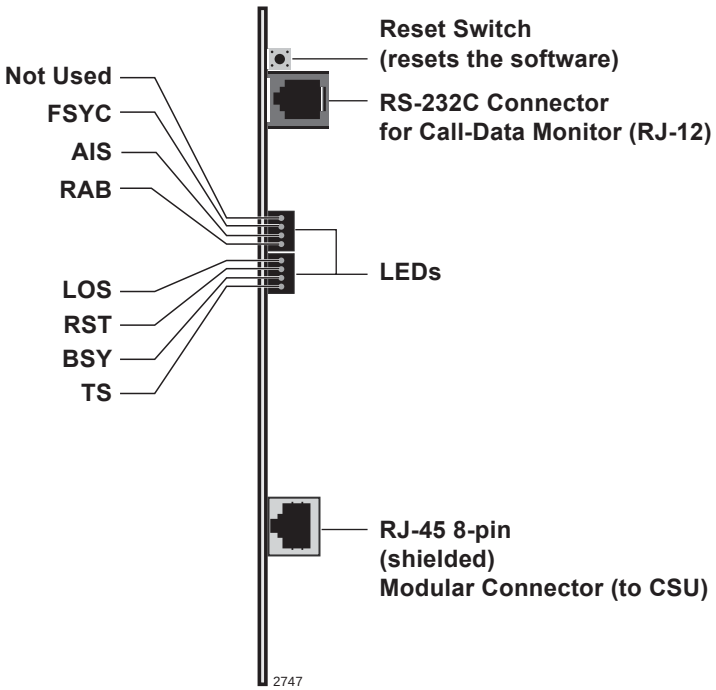


Figure 5-3 RPTU LEDs and Connectors

Table 5-2 LED Functions

LED	Functions
FSYC	Frame Synchronisation On:Frame alignment is lost. Off:Frame alignment is working properly.
AIS	Alarm Indication Signal On:Receiving an alarm from the Exchange. Off:Circuit is working properly.
RAB	Remote Alarm On:Receiving a remote alarm from the Exchange. Off:Circuit is working properly.
LOS	Loss of Signal On:IC signal cannot be detected. Off:Circuit is working properly.
RST	Reset On:CPU is resetting the software. Off:Circuit is working properly.
BSY	Busy On:One or more B-channels are busy. Off:All B-channels are idle.
TS	Timing Signal On:Circuit is secondary timing source. Off:Circuit is not used for system timing. Flashing:Circuit is primary timing source.

Cabling

To meet Part 15 of EU Rules, ISDN PRI equipment must be connected using CAT5, Shielded Twisted-Pair (STP) cabling between the NTE and the RPTU. CAT5 STP protects against cross talk, Radio Frequency Interference (RFI), and/or Electro Magnetic Interference (EMI). STP protects ISDN signal data while being transmitted through the cable and keeps the cable itself from emitting EMI and RFI.

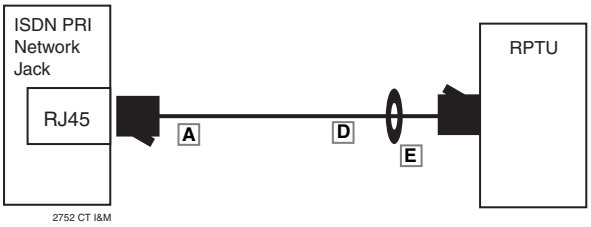
Important! *To avoid ground loops, connect only the RPTU end of the shielded cable to earth. The NTE earth should not be connected to the cable shield.*

A detailed pinout diagram for the RJ45 jacks and the modular cords/adaptors is shown in Figure 5-4 below.

Toshiba will ship a 5 metre (16.5ft) shielded patch cord terminated with BS EN28877 connectors with each RPTUIF.

Cable Installation

The RPTU PCB is shipped with a Toshiba RPRI cable kit for connection of the RPTU to a CSU. Install the kit as shown in Figure 5-5.



RJ45 Contact No.	TE
1	RX
2	RX
3	Shield
4	TX
5	TX
6	Shield
7	Not Used
8	Not Used

Figure 5-4 Detailed Pinouts for ISDN PRI Cabling

Ferrite Core

Install the Ferrite core provided with the RPRI cable kit as shown in Figure 5-5. This core is needed to comply with EU requirements.

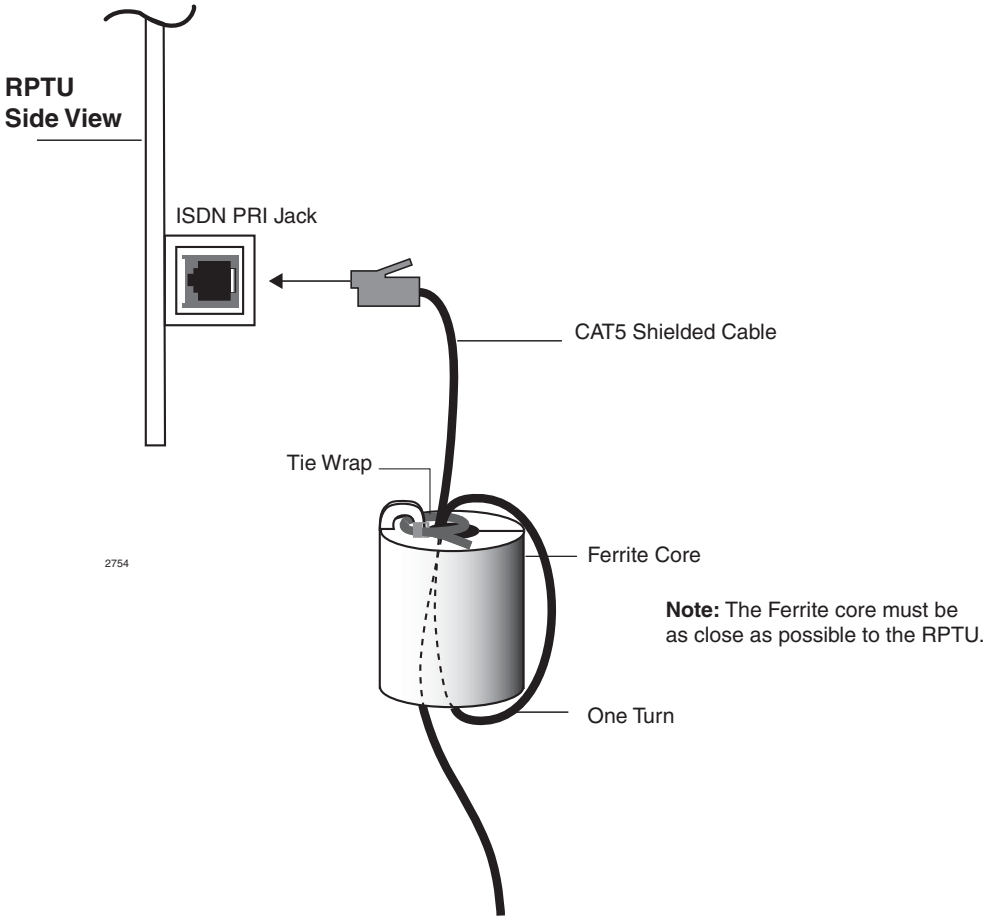


Figure 5-5 Ferrite Core Installation

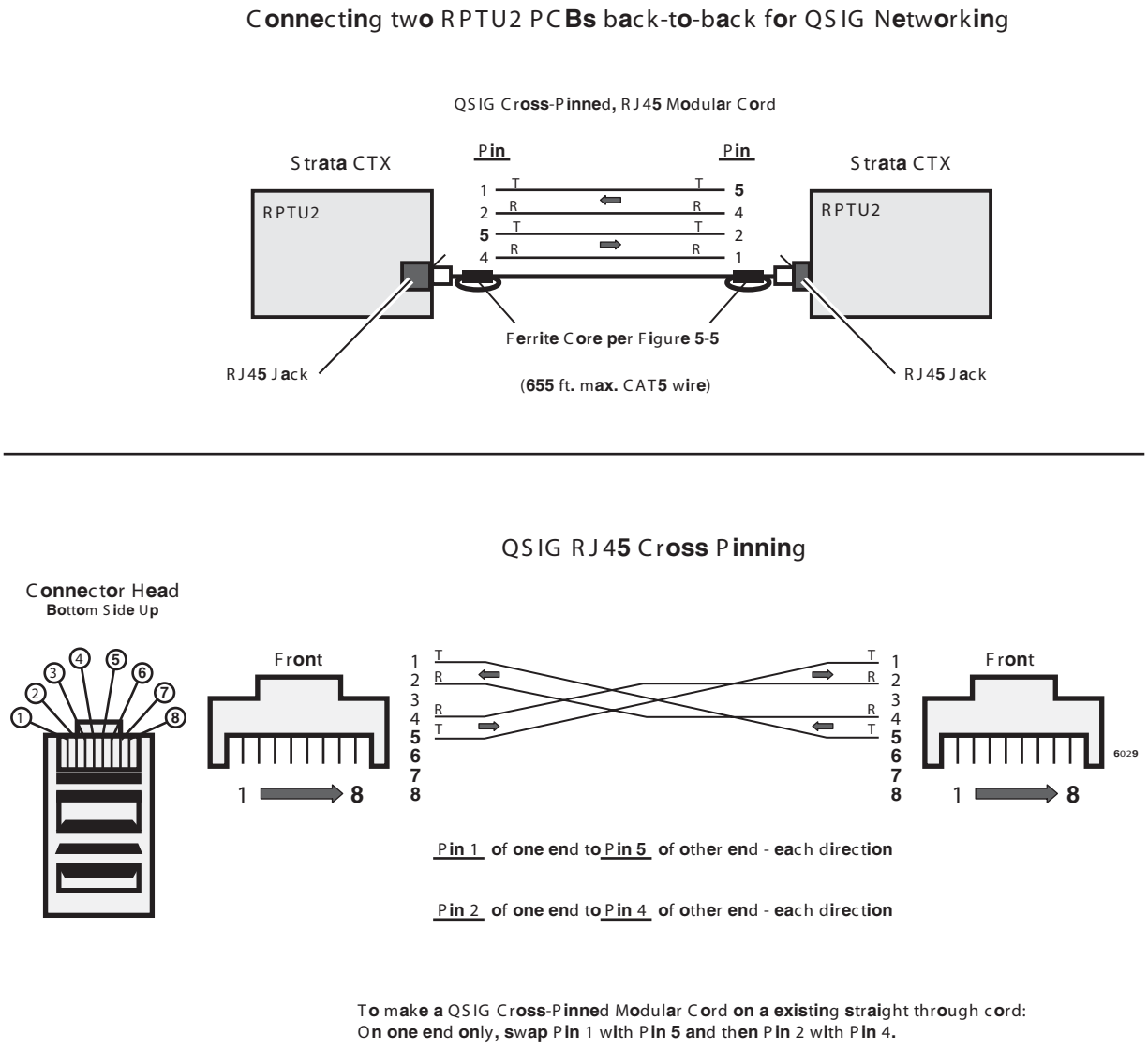


Figure 5-6 Direct Connect Two RBTU2 PCBs for Qsig Networking

RBSU/RBSS Interface Units

Circuits per PCB: *2 circuits (2B + D each circuit)*

Interfaces with: *ISDN BRI TE when connected to the Public Network or a BRI S-type, NT or TA devices when connecting to ISDN station equipment*

Older Version(s): *none*

RBSU/RBSS switches, jumpers, and connectors are shown in Figures 5-9 and 5-10 on page 5-12 and described in Table 5-3.

LEDs on the RBSU/RBSS show a continuous status of BRI operation. Refer to Table 5-4 on Page 5-14 for a list of each LED's status.

Overview

The RBSU and RBSS PCBs provide the Basic Rate Interface (BRI) circuits. The RBSU is the main plug-in PCB that plugs into the Strata CTX cabinet slots.

The RBSS is an optional PCB that plugs onto the RBSU. Each PCB provides two ISDN BRI circuits. Each BRI circuit provides 2 B-channels + 1D channel for voice/data/video applications.

An REBU PCB is a piggy-back PCB that plugs onto the RBSU and provides basic functions for RBSU/RBSS circuits so it must always be installed on the RBSU.

The RBSU circuits are four-wire S/T type circuits and connect to the Public Switched Telephone Network (PSTN) BRI lines using an Network Terminator unit (NT1); or, on the station side, they can connect to ISDN Terminal Equipment (TE) or Terminal Adapters (TA) as shown in Figure 5-7.

TE devices include any ISDN device (telephone, fax, computer) that connects directly to S/T ISDN BRI circuits. TA devices match the protocol of non-ISDN devices (telephone, fax, computer) to the protocol of S/T ISDN BRI circuits.

RBSU circuits can be configured as:

- BRI – TE circuits which connect to Telephone Network BRI lines using a NT1.
- BRI – NT circuits which connect to ISDN TEs or TAs. These devices must be S-type station devices.

Important! *The Strata CTX BRI circuits allocate line numbers and station ports differently. Each BRI circuit consumes two line numbers and two station port when configured as line-side or station side.*

The RBSU connection options (BRI line or ISDN TE-1/TA devices) are selected in customer database programming and option switches located on the RBSU.

The network BRI line connection is a point-to-point connection, which means that the network BRI line can only be connected to one RBSU circuit via the NT1 (T-reference point).

RBSS circuits connect directly to S-type TE-1 or TA ISDN devices only. They do not support BRI-TE telephone network BRI line connections.

The RBSU, and/or RBSS circuits that connect to the Strata CTX station side, (BRI-NT, S-reference point) allows direct connection of multiple ISDN (TE-1 or TA) devices. The S point of the RBSU/RBSS supports the Toshiba Strata CTX passive bus, also known as point-to-multipoint connection. The terminal-side (S-point) of the RBSU/RBSS BRI circuit can have parallel connections of up to two TE-1s or TAs maximum.

When multiple TE-1 and TA devices are installed on a single RBSU/RBSS BRI circuit, the devices must share, or contend for, that circuit's two B-channels. That is to say, a maximum of two simultaneous voice and/or data calls are allowed between both devices connected to the same BRI circuit. The contention rule for the two BRI B-channels is first come, first serve.

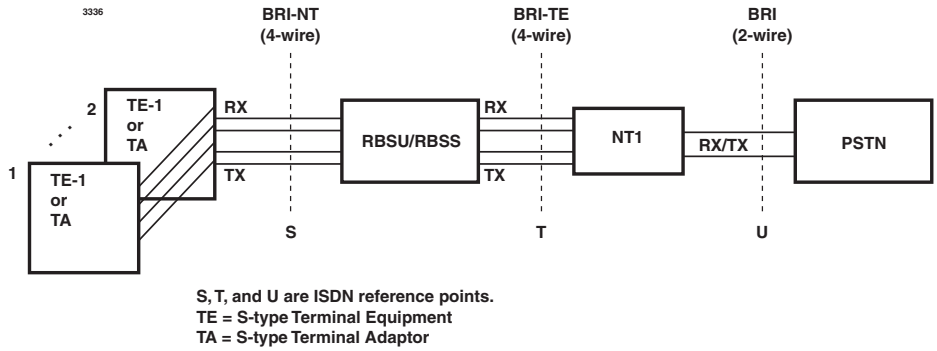


Figure 5-7 RBSU/RBSS Interfaces between the S/T Reference Points

Capacity and Cabinet Slot Information

The RBSU/RBSS can be installed in any slot except in a slot that has been left vacant to provide capacity for RPTU2 or RPTU. Each RBSU and/or RBSS contains two circuits and each circuit reduces the system capacity by two station ports *and* two Exchange lines (one port/line per B-channel). Therefore, if the RBSU PCB is installed, the station port and Exchange line count will increment by four ports and four lines at the RBSU cabinet slot.

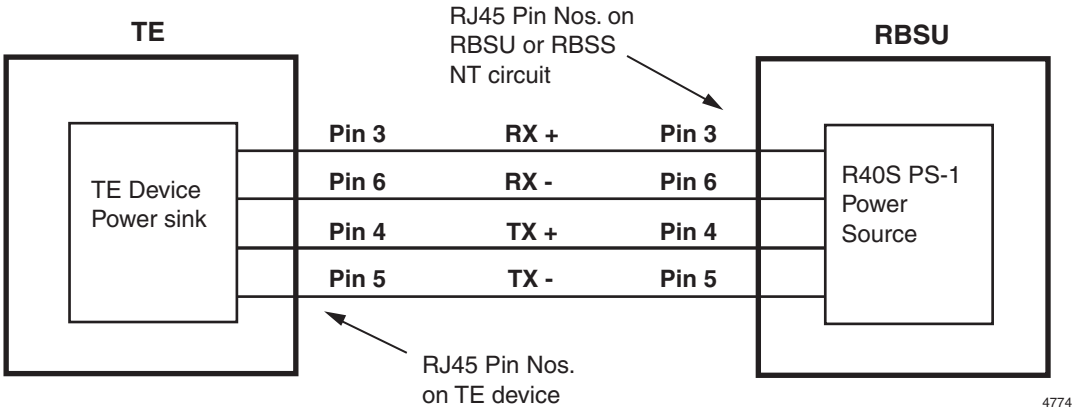
If the RBSU/RBSS is installed, the station port and Exchange line count will increment by eight station ports and eight lines at the RBSU/RBSS cabinet slot. RBSU and RBSS PCBs can be installed in any combination so long as the number of RBSU PCBs is the same or greater than the number of RBSS PCBs. See "ISDN BRI Digital Station PCBs" on Page 1-25 for the maximum BRI circuits allowed.

PS-1 Backup Power Option

The RBSU provides an optional backup power supply, R40S, that will supply backup power to TE devices in the event of an AC power loss. This power backup option only applies to RBSU or RBSS circuits that are configured in the NT mode. See Figure 5-11 to install the R40S.

Also the Strata CTX system must have battery backup to allow the R40S power backup function to operate. The R40S power supply is an ISDN, PS-1 type power unit which means it supplies power to TE devices on the RBSU/RBSS transmit and receive wire pairs as shown in Figure 5-8. This power arrangement is also known as phantom power.

Each of the four circuits on RBSU/RBSS can be connected to share the R40S using option switches on the PCBs (see Table 5-3). Before using the R40S as a backup power source, make sure the TE devices do not require more power than the R40S can supply and the TE is compatible with the ISDN PS-1 power arrangement.



R40S Power Limits:
Voltage: 33.3VDC to 38.85VDC maximum
Current: 100mA maximum (25mA maximum per each RBSU/RBSS circuit)

Figure 5-8 Power Limits of the Backup Power Supply

RBSU/RBSS Installation

Step 1: Run Related Programs

➤ Run all ISDN programs related to RBSU/RBSS BRI circuits prior to installation of the PCBs. This enables the circuits to operate immediately upon insertion. ISDN BRI programs are explained in the *Strata CTX Programming Manual* under the ISDN tab.

Step 2: Set Option Switches/Jumpers

➤ Set all option switches and jumpers on the RBSU and RBSS PCBs before plugging the RBSS onto the RBSU or inserting the RBSU into the system. RBSU/RBSS switch/jumper information and locations are shown in Figures 5-9, 5-10 and Table 5-3.

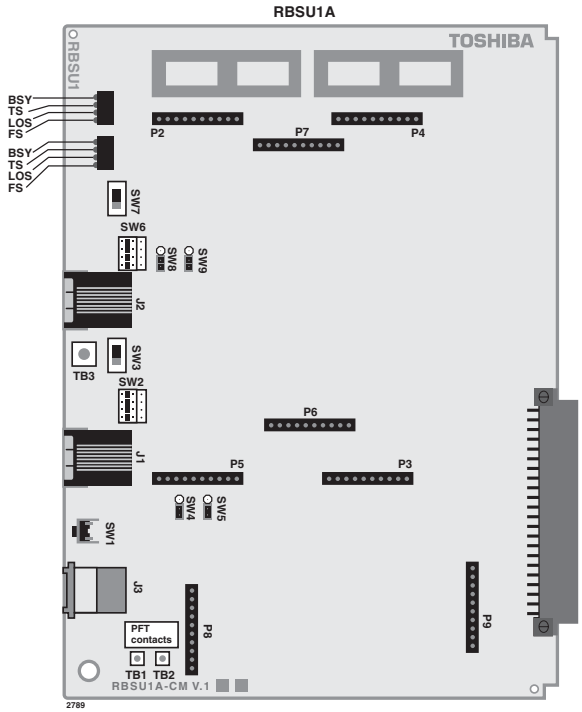


Figure 5-9 RBSU PCB

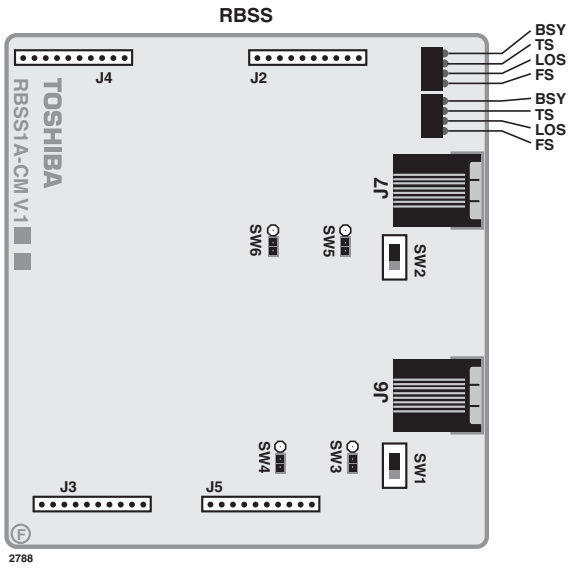


Figure 5-10 RBSS PCB

Table 5-3 RBSU/RBSS Option Switches, Jumpers, and Connectors

PCB	Circuit	Option Switch	Type	Circuit Type		Description
				TE	NT	
RBSU	All	SW 1	Push-button	N/A	N/A	Resets firmware on all circuits of RBSU/RBSS. Drops calls off the RBSU/RBSS.
	1	SW 2	Jumper	X	X	Causes the circuit to operate as TE or NT[1].
	1	SW 3	Slide	On	Off	Switches a 100-ohm resistor in/out of the circuit.
	1	SW 4, 5	Jumper	N/A	On	Switches PS-1 in/out of the circuit.
	2	SW 6	Jumper	X	X	Causes the circuit to operate as TE or NT[1].
	2	SW 7	Slide	On	Off	Switches a 100-ohm resistor in/out of the circuit.
	2	SW 8, 9	Jumper	N/A	On	Switches PS-1 in/out of the circuit.
RBSS	3 (NT only)	SW 1	Slide	On	Off	Switches a 100-ohm resistor in/out of the circuit.
	3 (NT only)	SW 3, 4	Jumper	N/A	On	Switches PS-1 in/out of the circuit.
	4 (NT only)	SW 2	Slide	On	Off	Switches a 100-ohm resistor in/out of the circuit.
	4 (NT only)	SW 5, 6	Jumper	N/A	On	Switches PS-1 in/out of the circuit.

1. Requires programming to set as TE or NT.

Step 3: Install the RBSS

Note If one or two additional BRI-NT circuits are required, install the RBSS (see Figure 5-11).

1. Align the four connectors carefully while observing the “UP” arrows on the REBS.
2. Plug the RBSS onto the RBSU.

Step 4: Install the R40S

Note If ISDN PS-1 backup power for TE devices is required, install the R40S (optional PCB) (see Figure 5-11).

1. Align the two connectors carefully while observing the “UP” arrows on the R40S.
2. Plug the R40S onto the RBSU.

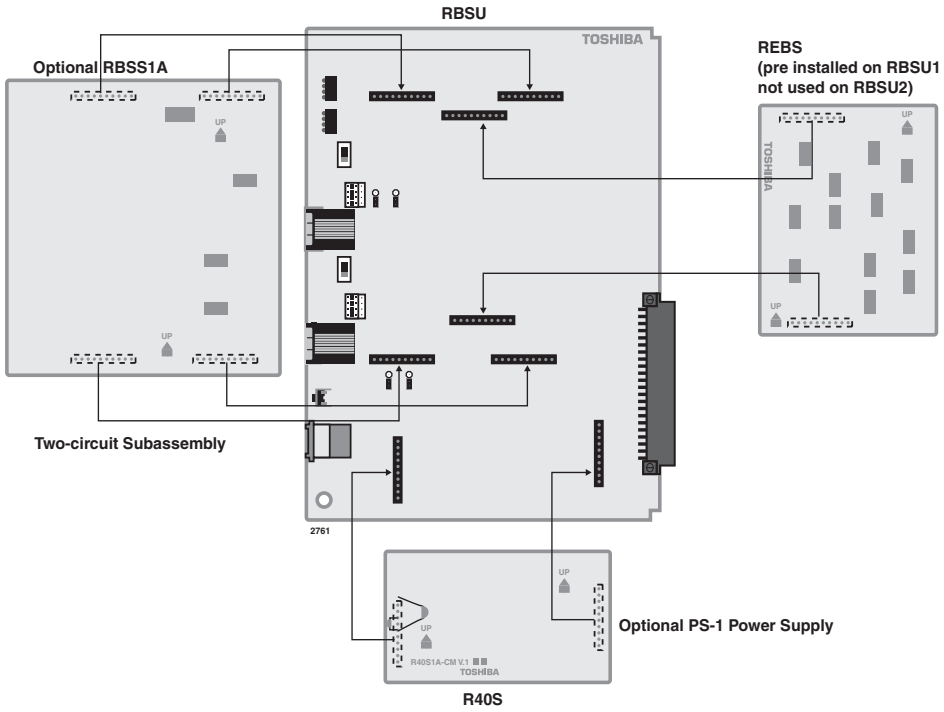


Figure 5-11 Location of RBSU Plug-on PCBs

Step 5: Install RBSU/RBSS PCBs into Cabinet

After setting the switches and jumpers and installing the plug-on PCBs as described in the preceding paragraphs, the RBSU/RBSS PCBs can be installed in the appropriate cabinet slots. Refer to RBSU/RBSS Capacity and Cabinet Slot Information on Figure 5-13. After the RBSU/RBSS is installed in the Strata CTX cabinet, the status LEDs and connecting jacks are positioned as shown in Figure 5-12.

Table 5-4 RBSU/RBSS LED Indications

LED	Indication
BSY	**Circuit Busy** On – Any B-channel is in use. Off – B-channels are idle.
TS	**Timing Source** Blinking On/Off – The RBSU is extracting the clock from the BRI line and is the Primary synchronisation circuit for ISDN. On – The RBSU is the secondary (backup) synchronisation circuit for the ISDN. Off – The RBSU is not used for ISDN synchronisation.
LOS	**Loss of Signal** On – Clock timing cannot be detected from the line. Off – Normal condition.
FS	**Frame Alignment Alarm** On – Frame alignment cannot be established. Off – Frame alignment is established.

Modular Jack Pin Configurations

BRI (S/T) Circuit Jack (TE or NT Mode)

The RBSU/RBSS BRI circuit jack is a shielded RJ45 (8-pin modular) with Transmit (Tx) and Receive (Rx) pin numbers as shown in Figure 5-12. The Tx and Rx pin numbers change when the BRI circuit is configured with RBSU/RBSS option switches for TE or NT (Tables 5-3 and 5-12). If the R40S is installed on the RBSU, the PS-1 voltage is carried on the Tx/Rx wires with polarity. (See Table 5-5).

The position of the RBSU/RBSS circuit jacks are shown in Figure 5-13 and 5-12 respectively.

Table 5-5 RJ45 Pins in the 8-pin Modular Jack

Pin No.	TE Side	NT Side	PS1/R40S Polarity
1	N/C	N/C	N/C
2	N/C	N/C	N/C
3	Tx	Rx	+
4	Rx	Tx	+
5	Rx	Tx	-
6	Tx	Rx	-
7	N/C	N/C	N/C
8	N/C	N/C	N/C

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Front View of RJ-45 Jack Cavity
Note: The RJ-45 pins are numbered as shown above.

Monitor Jack

The RBSU/RBSS monitor jack is an RJ11 (6-pin modular). This jack provides an RS-232 output that enables you to monitor the RBSU/RBSS BRI circuit D-channel, layer-2 and layer-3 data. The monitor

jack pin configuration and communication parameters are the same as RPTU (see Figures 5-21, 5-24 and 5-25). For RBSU monitor jacks, see Figure 5-23 and Figure 5-12 on page 5-15.)

RBSU/RBSS Premise Wiring Guidelines

Grounding Terminal Screws

TB3 is a screw terminal that can be used to connect a ground wire to the RBSU PCB (see Figure 5-12 for the location). This ground enables the RBSU/RBSS to meet Electro Magnetic Compatibility (EU) requirements. The RBSU complies with EU requirements without grounding TB3 on the RBSU, so it is not necessary to connect a ground wire to TB3.

BRI Wire Type Recommendations

CAT5 wire is recommended for ISDN BRI customer-premises wiring. While the ISDN BRI signal works for some distance over almost any wire that is suitable for analogue voice service, better wire enables longer runs. CAT5 provides better 100-ohm impedance matching (at little extra cost) between the RBSU/RBSS circuit and the station Terminal Equipment (TE-1).

Normally the CAT5 wiring does not have to be shielded when used for ISDN BRI premises wiring. However, the RJ45 jacks on the RBSU/RBSS BRI circuits are shielded and provide a ground shield in the event that shielded modular plugs and cable are used.

Note If using shielded cable and plugs, cable runs should only be grounded at the Strata CTX RBSU/RBSS, RJ45 jacks. To prevent ground loops, do not ground both ends of shielded cable runs.

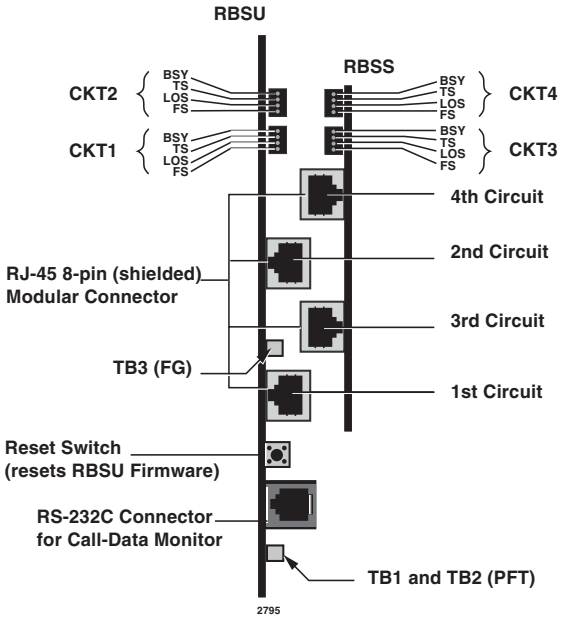


Figure 5-12 RBSU/RBSS Location of LEDs and Connector Locations

RBSU/RBSS BRI Cable Jacks and Connectors

In the U.K., the standard connector for ISDN equipment is the eight-pin RJ jack. Patch cables have eight-pole plugs at both ends. The same pinout applies to both ends of an ISDN cable, which is the practice of the data world. This means that a flat untwisted cable with an RJ modular plug at both ends

will have the locking tab of the plug on one end, “up;” and on the other end, “down,” as shown in Figure 5-13.

A cord of up to 10 meters connects the ISDN BRI RJ45 wall jack to the desktop TE-1 or TA RJ45 jack.

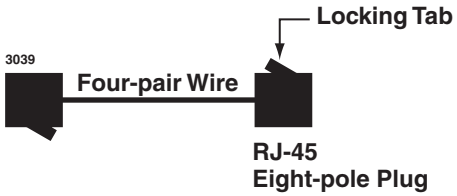


Figure 5-13 Modular ISDN Data Cable

Table 5-6 TIA-568B (RJ45) Jack – ISDN Standard Interface Modular Connector Pinout (RBSU-NT mode)

Pin	Colour	Name	Function
1		T2	(not used)
2		R2	(not used)
3	White/Blue	R3	RX+
4	Blue/White	R1	TX+
5	White/Green	T1	TX-
6	Green/White	T3	RX-
7		T4	(not used)
8		R4	(not used)

Notes

- Pins are numbered left to right when looking into the jack cavity with the locking tab down.

Strata CTX BRI Circuit EU Ferrite Core Requirement

To ensure that the Strata CTX BRI circuit meets the EU requirements, it is necessary to run all wire connecting ISDN BRI circuits (TE and NT mode) through a Ferrite core. .

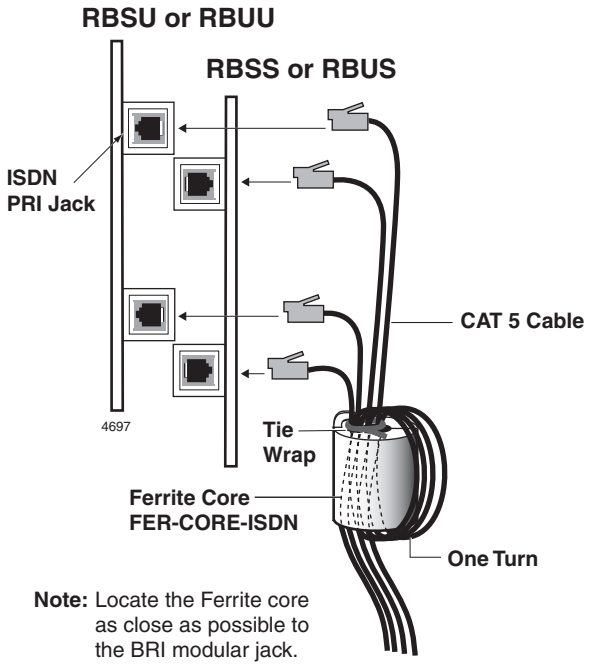


Figure 5-14 BRI Circuit Ferrite Core Installation

Connecting RBSU to Network Side (TE-Mode)

The RBSU only, not the RBSS, circuits can be connected to the network side of a BRI line. The RBSU circuits must be configured in the TE-mode (refer to option switches in Table 5-3 on Page 5-12 and Table 5-5 on Page 5-15).

In the U.K., the BRI line from the ISDN service provider is a two-wire U-type BRI line. This line connects to the RBSU TE circuit via a customer-provided NT1 as shown in Figure 5-15. The NT1 is necessary to convert the network BRI, two-wire, U interface to the RBSU BRI, four-wire, T interface.

The connection between the NT1 and the RBSU TE circuit is a point-to-point connection, so the NT1 can connect to only one RBSU BRI TE circuit.

A 100-ohm Terminating Resistor (TR) is required at one end of the point-to-point connection. The TR must be switched into the RBSU TE circuit (refer to option switches in Table 5-6 on Page 5-16 and Table 5-3 on Page 5-12) and off at the NT1 device or vice-versa.

The maximum loop length between the NT1 and the RBSU circuit is 400 meters using CW1308 or 800 metres using CW1700/1750 or equivalent.

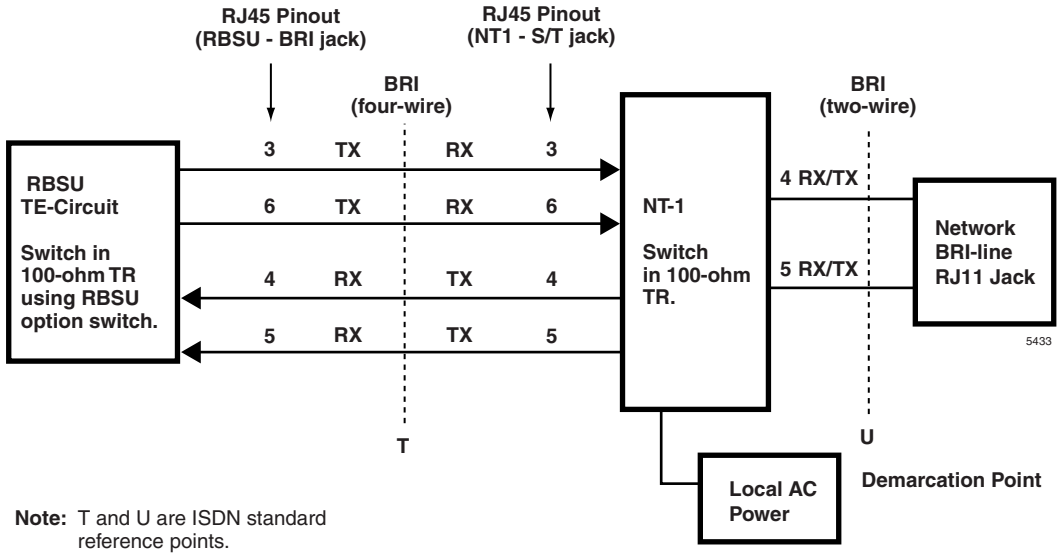


Figure 5-15 RBSU to NT1 Point-to-point Connection

Connecting RBSU/RBSS Station Devices (NT-Mode)

S-type TAs and TE-1s can be connected to the station side of RBSU and RBSS circuits. TA and TE devices must be powered by local AC power using AC adapter supplied with the TA or TE device. The RBSU/RBSS circuits must be configured in the NT mode when connected to TA and TE devices (refer to option switches in Table 5-3 on page 5-12 and Table 5-6 on page 5-16).

The TA enables you to connect non-ISDN voice and data devices to ISDN BRI circuits. The TA matches the protocol of existing interfaces (R-reference point) to the ISDN S/T protocol (see Figure on page 5-2). TA devices include asynchronous circuit-switched adapters that convert RS-232 sync data (like data from a PC COM port) to B-channel 64 kbps sync.

TAs also enable you to connect standard telephones and non-ISDN fax machines to receive and make calls over ISDN circuits. TEs include any user device (telephone, fax, PC video conference board) that is designed to plug directly into the ISDN (S/T) interface without the use of a TA.

.

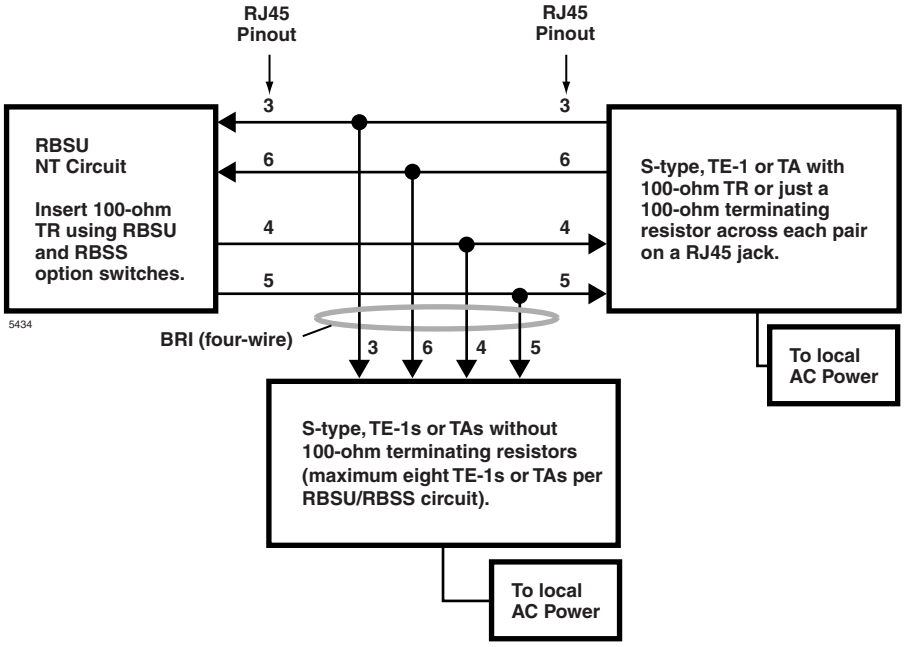


Figure 5-16 RBSU/RBSS NT Circuit Pinout on Passive Bus

As a parallel bus, the RBSU/RBSS BRI-NT passive bus will accept TE-1 and TA devices scattered on the bus; however, the locations of the TE and TA devices on the S bus is limited by timing considerations. Specifically, the round trip propagation delay of a signal from the RBSU/RBSS circuit to one device must be within four microseconds of the delay from the other device on the bus. That is to say, layer-1 frames from the RBSU/RBSS must be received within a two microsecond window. This says nothing about how large the delay can be. In fact, it can be much larger, as long as the differences remain small.

To control electrical characteristics, a 100-ohm terminating resistor (TR) is required at the end of the passive bus. One resistor should be across the Tx pair and one across the Rx pair at either end of the passive bus. Branch-type passive bus configurations, shown in Figures 5-17~5-19, may only require a TR on the RBSU/RBSS NT circuit side and not on the TE or TA device side of the bus.

The RBSU and RBSS circuits provide an option switch that allows the 100-ohm TR to be switched into the circuit on the Strata CTX side of the bus (see Table 5-3 on Page 5-12 and Table 5-6 on Page 5-16). Most TE-1 and TA devices also provide option switches to connect 100-ohm terminating resistors as shown in Figure 5-15.

If the TE or TA devices do not provide TRs, they may be permanently wired in place on a RJ45 jack at the far end of the bus. Only one terminating resistor on each pair should be on the far (TE) end of the passive bus - do not switch in TRs on more than one TE-1 or TA device on the passive bus.

Important! *The correct placement of TRs on the Passive Bus is critical to ISDN BRI circuit operation (see the following RBSU/RBSS Passive Bus configurations section).*

RBSU/RBSS Passive Bus Configurations

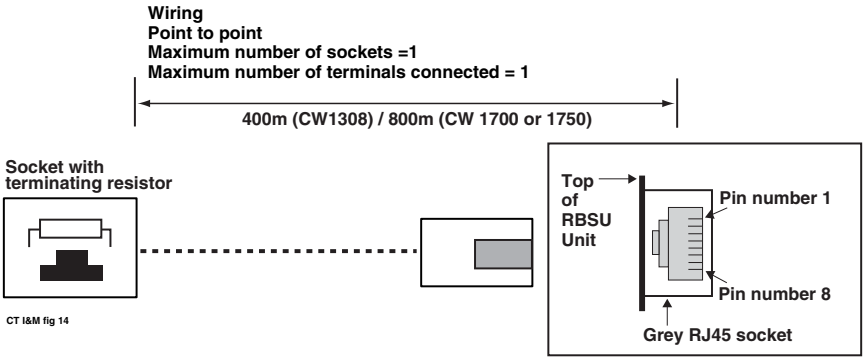


Figure 5-17 Point to Point Wiring

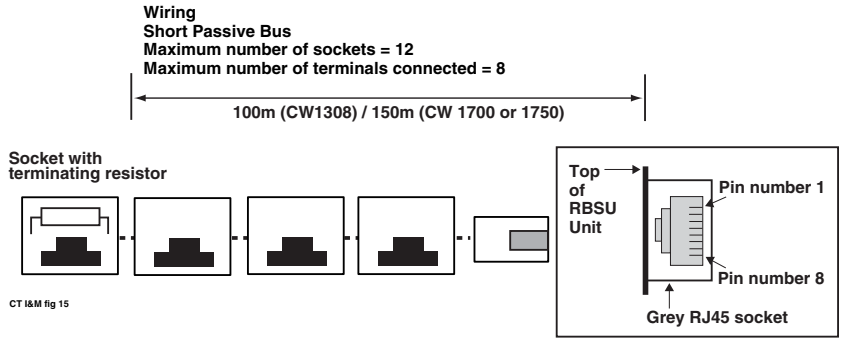


Figure 5-18 Short Passive Bus Wiring

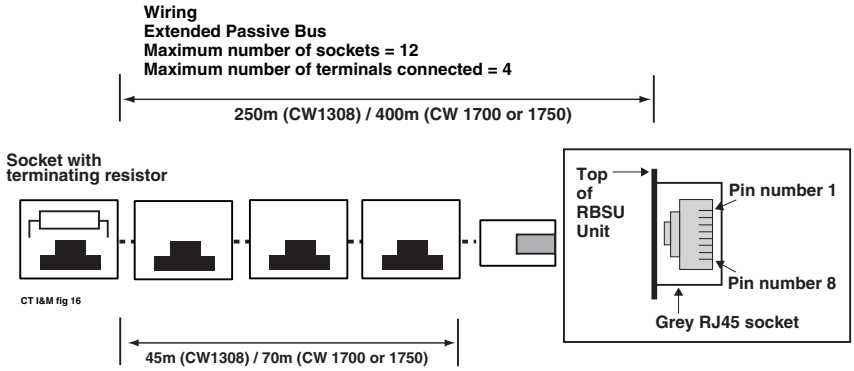


Figure 5-19 Extended Passive Bus Wiring

Timing and Synchronisation

In the Strata CTX, one PRI or BRI can be programmed to extract the Stratum clock signal. It uses the signal as the Strata CTX system Primary clock reference. The clock provider should be a reliable source, such as a network operator. All other PRI or BRI lines connected to the Strata CTX will be synchronised to the same clock provider. If the PRI or BRI are not synchronised to the same clock provider, the Strata CTX could experience “slip” problems.

The timing or synchronisation program determines how the Strata CTX digital voice or data transmission path is synchronised with the far-end digital path. For proper PRI or BRI operation, the equipment at each end of the line must be synchronised.

The Strata CTX processor time switch is synchronised as the slave to the PRI or BRI line (Line 1 in Figure 5-20).

If a malfunction occurs and Primary reference synchronisation is lost, the Strata CTX automatically switches modes and synchronises to the Secondary reference, provided that there is another PRI or BRI installed in the Strata CTX system.

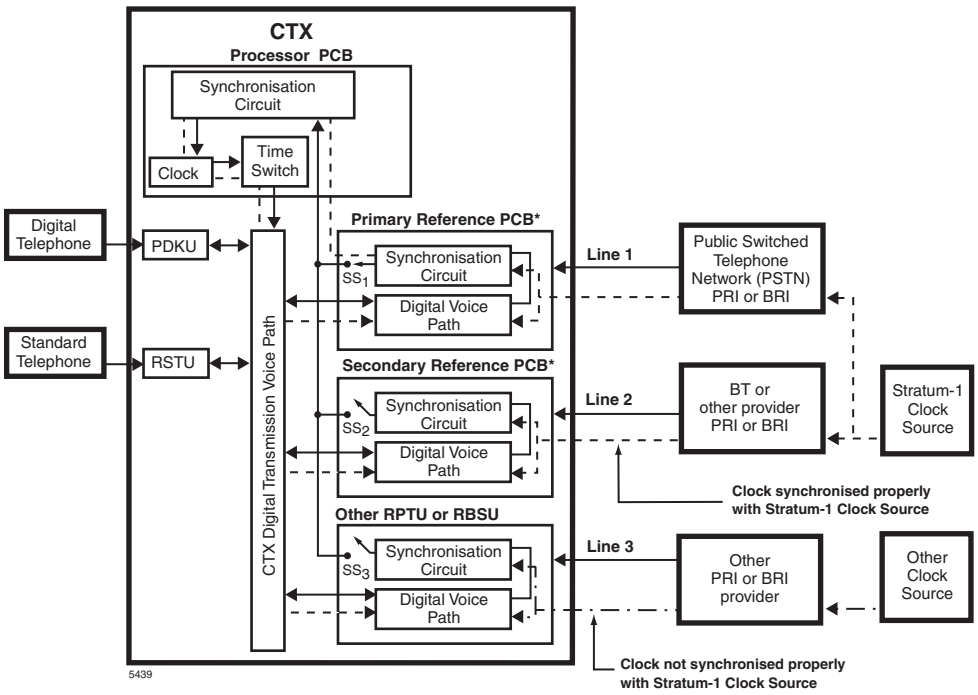


Figure 5-20 Primary and Secondary References

Figure 5-20 shows the Primary reference PCB. The clock signal from Line 1 passes through the PCB Software Switch (SS_1) and the synchronisation circuit of the RCTU PCB. The RCTU clock passes the clock source through the time switch and synchronises the Strata CTX digital transmission voice or data path.

The Secondary reference is activated if the Primary reference fails. The Strata CTX automatically *switches over* to the Secondary reference PCB by opening its synchronisation circuit (SS_1) and closing the synchronisation circuit (SS_2). When this occurs, the digital voice or data path of the Strata CTX is synchronised to the Line 2 clock source.

If the path is not synchronised to the Stratum – 1 clock source, calls connected through that path experience “slipping” or “jitter” in the digital voice or data path (channels). The unsynchronised signal produces a clicking or popping sound that is heard by the people connected through this path or causes data errors on data transmissions.

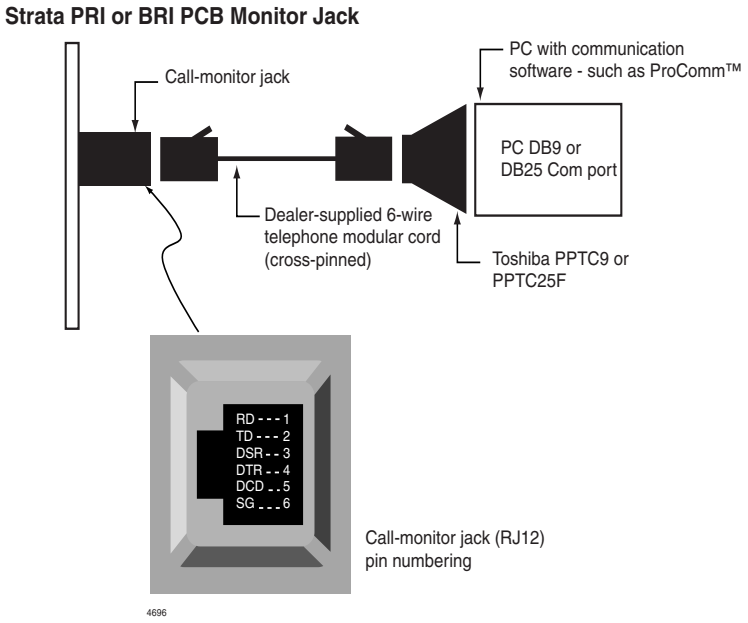
PRI/BRI Call Monitoring

The Strata CTX ISDN circuit cards provide an RS-232 monitor function that enables you to monitor the ISDN D-channel call progress layer two and three messages (setup, connect, and release). This data can be monitored live, saved to a file, and/or printed using a PC with communication software.

The hardware connections and communication parameters for the ISDN monitor port are shown in Figure 5-21. Once this connection is setup and established, call monitoring data continues to be sent (on the fly) as PRI and BRI calls are originated or received.

Two sample printouts from the RPTU monitor are provided. Figure 5-22 shows typical ISDN PRI start-up and synchronisation sequences that occur at connection and power on and shows typical ISDN PRI outgoing call setup and release sequences. BRI monitor data is similar to PRI monitor data.

The communication parameters for all call-monitor jacks are 9600 bps, 7, 1, even.



Note The RPTU and RBSU ISDN interface PCBs each have a call-monitor jack. The pin numbering and communication parameters are the same for each call-monitor jack. The call-monitor jack on each PCB provides data only for the circuits of the PCB on which it appears.

Figure 5-21 Call-monitor Jack for the RPTU and RBSU

Call Monitor Output for ISDN

See the following figures for examples of Call Monitor Output printouts.

```
/*-------------------------*/
  Copyright(C) 1997
  TOSHIBA Corporation
  All rights reserved
  RPTU Ver.1G
  [Reset]
/*-------------------------*/
<U1>00;00'016 Act.       (F1)

/*-------------------------*/
  Copyright(C) 1997
  TOSHIBA Corporation
  All rights reserved
  RPTU Ver.1G
  [Reset]
/*-------------------------*/
<U1>00;00'016 Act.       (F1)
<U1>00;09'634 LOS        (F3)
<U1>00;12'109 Act.       (F1)

/*-------------------------*/
  Copyright(C) 1997
  TOSHIBA Corporation
  All rights reserved
  RPTU Ver.1G
  [Reset]
/*-------------------------*/
<U1>00;00'017 Act.       (F1)
<U1>00;06'619 Tx :[SAPI]00 C [TEI]000 [FRAME]SABME P
<U1>00;06'630  Rx:[SAPI]00 R [TEI]000 [FRAME]UA    F
<U1>00;07'236  Rx:[SAPI]00 C [TEI]000 [FRAME]SABME P
<U1>00;07'245 Tx :[SAPI]00 R [TEI]000 [FRAME]UA    F
<U1>00;11'754 LOS        (F3)
<U1>00;14'228 Act.       (F1)
<U1>00;14'415 Tx :[SAPI]00 C [TEI]000 [FRAME]SABME P
<U1>00;14'427  Rx:[SAPI]00 R [TEI]000 [FRAME]UA    F
<U1>00;14'753 Tx :[SAPI]00 C [TEI]000 [FRAME]SABME P
<U1>00;14'765  Rx:[SAPI]00 R [TEI]000 [FRAME]UA    F
<U1>00;24'275 Tx :[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]000 [N(R)]000
              PD = Q.931(08)
              CR = 02 0002
              MT = SETUP(05)
              04 03 80 90 A2 18 03 A9 83 97 70 08 C1 35 38 33  ..........p..583
              33 30 30 31                                      3001
<U1>00;24'292  Rx:[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]001
<U1>00;28'315 Tx :[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]001 [N(R)]000
              PD = Q.931(08)
              CR = 02 0002
              MT = SETUP(05)
              04 03 80 90 A2 18 03 A9 83 97 70 08 C1 35 38 33  ..........p..583
              33 30 30 31                                      3001
<U1>00;28'333  Rx:[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]002
<U1>00;43'812  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]000 [N(R)]002
              PD = Q.931(08)
              CR = 02 8002
              MT = CONN(07)
```

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Figure 5-22 PRI Start-up and Synchronisation Sequences

```
<U1>01;14'446  Rx:[SAPI]00 C [TEI]000 [FRAME]RR    P [N(R)]004
 <U1>01;14'449 Tx :[SAPI]00 C [TEI]000 [FRAME]RR    P [N(R)]002
 <U1>01;14'456 Tx :[SAPI]00 R [TEI]000 [FRAME]RR    F [N(R)]002
 <U1>01;14'460  Rx:[SAPI]00 R [TEI]000 [FRAME]RR    F [N(R)]004
 <U1>01;19'450 Tx :[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]004 [N(R)]002
               PD = Q.931(08)
               CR = 02 0003
               MT = SETUP(05)
               04 03 80 90 A2 18 03 A9 83 97 70 08 C1 35 38 33  ..........p..583
               33 30 30 31                                      3001
 <U1>01;19'466  Rx:[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]005
 <U1>01;19'878  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]002 [N(R)]005
               PD = Q.931(08)
               CR = 02 8003
               MT = CALL PROC(02)
               18 03 A9 83 97                                   .....
 <U1>01;19'888 Tx :[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]003
 <U1>01;19'924  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]003 [N(R)]005
               PD = Q.931(08)
               CR = 02 8003
               MT = ALERT(01)
               18 03 A9 83 97                                   .....
 <U1>01;19'932 Tx :[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]004
 <U1>01;25'464  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]004 [N(R)]005
               PD = Q.931(08)
               CR = 02 8003
               MT = CONN(07)
               18 03 A9 83 97                                   .....
 <U1>01;25'476 Tx :[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]005
 <U1>01;25'785 Tx :[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]005 [N(R)]005
               PD = Q.931(08)
               CR = 02 0003
               MT = CONN ACK(0F)
 <U1>01;25'799  Rx:[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]006
 <U1>01;46'127  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]005 [N(R)]006
               PD = Q.931(08)
               CR = 02 8003
               MT = DISC(45)
               08 02 80 90                                      ....
 <U1>01;46'138 Tx :[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]006
 <U1>01;46'449 Tx :[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]006 [N(R)]006
               PD = Q.931(08)
               CR = 02 0003
               MT = REL(4D)
               08 02 80 90                                      ....
 <U1>01;46'464  Rx:[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]007
 <U1>01;46'784  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]006 [N(R)]007
               PD = Q.931(08)
               CR = 02 8003
               MT = REL COMP(5A)
               08 02 80 90                                      ....
 <U1>01;46'795 Tx :[SAPI]00 R [TEI]000 [FRAME]RR      [N(R)]007
 <U1>02;16'659 Tx :[SAPI]00 C [TEI]000 [FRAME]RR    P [N(R)]007
 <U1>02;16'670  Rx:[SAPI]00 R [TEI]000 [FRAME]RR    F [N(R)]007
 <U1>02;22'661  Rx:[SAPI]00 C [TEI]000 [FRAME]INFO    [N(S)]007 [N(R)]007
               PD = Q.931(08)
               CR = 02 0004
```

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Figure 5-23 PRI Outgoing Call Connect and Release

BRI Call Monitor

The call-monitor jack located on the RBSU enables you to use a PC or ASCII terminal to monitor the BRI, D-channel call setup, layer-2 and layer-3 data (refer to Figure 5-21 on page 5-23 for information about connecting the monitor jack). Figures 5-24 and 5-25 provide examples of BRI call setup message information that is available from the RBSU call-monitor jack.

```
<U3>06;57'958 Tx :[SAPI]00 C [TEI]102 [FRAME]RR    P [N(R)]021
<U3>06;57'970  Rx:[SAPI]00 R [TEI]102 [FRAME]RR    F [N(R)]019
<U3>07;07'166  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]021 [N(R)]019
              PD = Q.931(08)
              CR = 01 0F
              MT = SETUP(05)
              04 03 80 90 A2 6C 05 C1 33 30 37 32 96 7B 01 81  .....l..3072.{..
<U3>07;07'217 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]022
<U3>07;07'735 Tx :[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]019 [N(R)]022
              PD = Q.931(08)
              CR = 01 8F
              MT = SETUP ACK(0D)
              18 01 89 1E 02 80 88 34 01 00 32 01 C2 95 2A 24  .......4..2...*$
              80 9E 14 44 49 41 4C 20 53 54 41 54 49 4F 4E 20  ...DIAL STATION
              4E 4F 2E 20 4F 52 20 9E 0B 41 43 43 45 53 53 20  NO. OR ..ACCESS
              43 4F 44 45                                      CODE
<U3>07;07'750  Rx:[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]020
<U3>07;07'866  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]022 [N(R)]020
              PD = Q.931(08)
              CR = 01 0F
              MT = INFO(7B)
              2C 01 31                                         ,.1
<U3>07;07'909 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]023
<U3>07;08'171  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]023 [N(R)]020
              PD = Q.931(08)
              CR = 01 0F
              MT = INFO(7B)
              2C 01 30                                         ,.0
<U3>07;08'192 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]024
<U3>07;08'415  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]024 [N(R)]020
              PD = Q.931(08)
              CR = 01 0F
              MT = INFO(7B)
              2C 01 30                                         ,.0
<U3>07;08'450 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]025
<U3>07;08'658  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]025 [N(R)]020
              PD = Q.931(08)
              CR = 01 0F
              MT = INFO(7B)
              2C 01 35                                         ,.5
<U3>07;08'682 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]026
<U3>07;08'941 Tx :[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]020 [N(R)]026
              PD = Q.931(08)
              CR = 01 8F
              MT = CALL PROC(02)
              18 01 89 32 01 82                                ...2..
<U3>07;08'958  Rx:[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]021
<U3>07;09'086 Tx :[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]021 [N(R)]026
              PD = Q.931(08)
              CR = 01 8F
              MT = ALERT(01)
              18 01 89 1E 02 80 88 34 01 40 95 2A 0B 80 9E 08  .......4.@.*....
              43 41 4C 4C 49 4E 47 20                          CALLING
<U3>07;09'106  Rx:[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]022
<U2>07;09'314 Tx :[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
<U4>07;09'318  Rx:[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
```

Figure 5-24 Outgoing Call Setup Output of BRI Call Monitor

```
<U2>07;40'993 Tx :[SAPI]00 R [TEI]113 [FRAME]RR    F [N(R)]000
<U4>07;40'997  Rx:[SAPI]00 R [TEI]113 [FRAME]RR    F [N(R)]000
<U4>07;41'000 Tx :[SAPI]00 R [TEI]113 [FRAME]RR    F [N(R)]000
<U2>07;41'005  Rx:[SAPI]00 R [TEI]113 [FRAME]RR    F [N(R)]000
<U3>07;41'168 Tx :[SAPI]00 C [TEI]102 [FRAME]RR    P [N(R)]027
<U3>07;41'180  Rx:[SAPI]00 R [TEI]102 [FRAME]RR    F [N(R)]025
<U3>07;53'481 Tx :[SAPI]00 C [TEI]127 [FRAME]U-INFO
              PD = Q.931(08)
              CR = 01 04
              MT = SETUP(05)
              04 03 80 90 A2 18 01 89 1E 02 80 83 6C 06 00 83  ............l...
              31 30 30 35 70 05 80 33 30 37 32 34 01 40        1005p..30724.@
<U3>07;53'514  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]027 [N(R)]025
              PD = Q.931(08)
              CR = 01 84
              MT = ALERT(01)
              18 01 89                                         ...
<U3>07;53'548 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]028
<U3>07;55'488  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]028 [N(R)]025
              PD = Q.931(08)
              CR = 01 84
              MT = CONN(07)
<U3>07;55'518 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]029
<U3>07;55'781 Tx :[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]025 [N(R)]029
              PD = Q.931(08)
              CR = 01 04
              MT = CONN ACK(0F)
              18 01 89 34 01 4F 95 2A 03 80 9E 00              ...4.O.*....
<U3>07;55'792  Rx:[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]026
<U3>07;57'585  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]029 [N(R)]026
              PD = Q.931(08)
              CR = 01 84
              MT = DISC(45)
              08 02 80 90                                      ....
<U3>07;57'619 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]030
<U3>07;57'942 Tx :[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]026 [N(R)]030
              PD = Q.931(08)
              CR = 01 04
              MT = REL(4D)
              08 02 80 90                                      ....
<U3>07;57'959  Rx:[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]027
<U3>07;57'979  Rx:[SAPI]00 C [TEI]102 [FRAME]INFO    [N(S)]030 [N(R)]027
              PD = Q.931(08)
              CR = 01 84
              MT = REL COMP(5A)
<U3>07;58'029 Tx :[SAPI]00 R [TEI]102 [FRAME]RR      [N(R)]031
<U1>07;59'447 Await. Sig.(F4)
<U4>08;05'903 Tx :[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
<U2>08;05'907  Rx:[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
<U2>08;05'928 Tx :[SAPI]00 R [TEI]112 [FRAME]RR    F [N(R)]000
<U4>08;05'932  Rx:[SAPI]00 R [TEI]112 [FRAME]RR    F [N(R)]000
<U2>08;05'969 Tx :[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
<U4>08;05'973  Rx:[SAPI]00 C [TEI]112 [FRAME]RR    P [N(R)]000
<U4>08;05'989 Tx :[SAPI]00 R [TEI]112 [FRAME]RR    F [N(R)]000
```

Figure 5-25 Incoming Call Setup Output of BRI Call Monitor

MDF PCB Wiring 6

This chapter contains point-to-point wiring diagrams for connection of telephones, lines, peripheral equipment, and power supplies for the universal slot PCBs of the Strata CTX system.

Wiring diagrams are divided into groups according to the PCB which provides the interface for, or controls the operation of, the associated equipment, as listed below:

Stations	PCB
DKTs (BPCI, DDSS, DDCB, ADM and BATU)	ADKU, BDKU, BDKS
DKTs and DDSS	PDKU
External Power for DKTs and DDCB	BDKU, PDKU
DKTs or Standard Phones	RDSU
Standard Telephone	RSTU, RDSU, RSTS, PSTU
Exchange Lines	**PCB**
Analogue Loop Start	RCOU/RCOS
Analogue E&M Tie Lines	REMU
	PEMU
Option Interface	**PCB**
External Paging, Night Bell, Night Transfer Door Lock and BGM mute control	BIOU
Power Failure	**PCB**
DPFT Power Failure Transfer box	DPFT

Notes

- Before using the Connect Record Sheets (following each Wiring Diagram), make copies for future use.
- The RBUU, RBUS cable connection is in Chapter 6 – MDF PCB Wiring.

Station Loop Lengths

In a single site installation, the Base and optional Expansion Cabinets must be placed within the allowed maximum distance of each other as designated by Table 6-1.

Table 6-1 Station Loop Lengths[1]

<table>
<tr><th rowspan="2">Mode</th><th colspan="3">Maximum line length (CW1308 0.5)</th></tr>
<tr><th>1 Pair</th><th>2 Pair</th><th>1 Pair plus external power [2]</th></tr>
<tr><td>DKT3000/DKT3500 or DKT2000-series [3]</td><td rowspan="6">1000 ft. (303m)</td><td rowspan="8">1000 ft. (303m)</td><td rowspan="8">1000 ft. (303m)</td></tr>
<tr><td>DKT with BVSU or DVSU</td></tr>
<tr><td>DKT with BHEU or HHEU</td></tr>
<tr><td>DKT with BPCI</td></tr>
<tr><td>DKT with BPCI + BHEU</td></tr>
<tr><td>DKT with BVSU + BHEU or DVSU + HHEU</td></tr>
<tr><td>DKT with DADM3020 or DADM2020 (1 ADM)</td><td>675 ft. (204m)</td></tr>
<tr><td>DKT with DADM3020 or DADM2020 (2 ADMs)</td><td>500 ft. (151m)</td></tr>
<tr><td>DDSS3060 or DDSS2060</td><td rowspan="3">1000 ft. (303m)</td><td rowspan="2">n/a</td><td rowspan="2">n/a</td></tr>
<tr><td>BATI, RATI</td></tr>
<tr><td>DDCB3</td><td>1000 ft. (303m)</td><td>1000 ft. (303m)</td></tr>
<tr><td rowspan="3">Standard telephones, voice mail, AA, etc.</td><td>Approx. 3000 ft. (909 m) with 150 ohm device.[4]</td><td rowspan="3">n/a</td><td rowspan="3">n/a</td></tr>
<tr><td>Approx. 9000 ft. (2727 m) with 150 ohm device.[4]</td></tr>
<tr><td>Approx. 21000 ft. (6363 m) with 150 ohm device.[4]</td></tr>
</table>

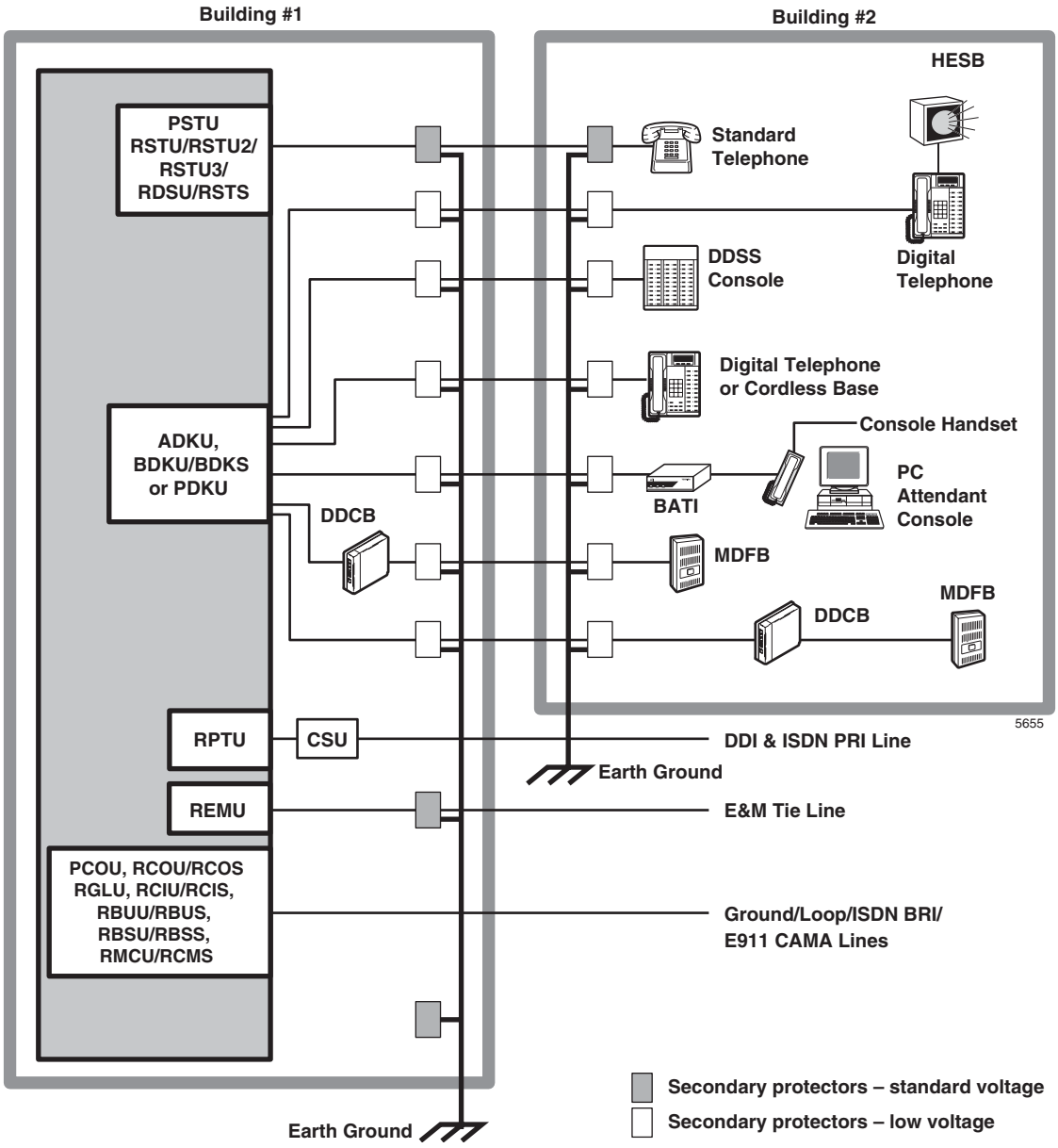
1. When the system is powered by backup battery, range may be less as the backup battery is discharged.
2. Two-pair wiring or optional telephone power supply is required to achieve maximum range in all cases.
3. BDKS does not provide the power wire pair, an external power supply is required to achieve maximum range (see Figure 6-6).
4. See manufacturer's product specifications for exact resistance of device.

Table 6-2 Loop Limits for DKT3000-series Telephones

Telephone/Device	Power Supply Unit (PSU) or Battery Backup	Maximum line length (CW1308 0.5)		
		1 Pair	2 Pair	1 Pair plus external power[1]
DKT3000/DKT3500-series or DKT2000-series models[2], DKT with BVSU or DVSU or DKT with BHEU or HHEU	PSU	1000 ft. (303m)	1000 ft. (303m)	1000 ft. (303m)
	Battery Backup	675 ft. (204m)		
DKT with BPCI	PSU	1000 ft. (303m)		
	Battery Backup	500 ft. (151m)		
DKT with BPCI + BHEU	PSU	1000 ft. (303m)		
	Battery Backup	500 ft. (151m)		
DKT with DADM3020 or DADM2020 (1 ADM)	PSU	675 ft. (204m)		
	Battery Backup	165 ft. (50m)		
DKT with DADM3020 or DADM2020 (2 ADMs)	PSU	500 ft. (151m)		
	Battery Backup	33 ft. (10m)	330 ft. (100m)	
DDSS3060 or DDSS2060	PSU	1000 ft. (303m)	1000 ft. (303m)	
	Battery Backup	675 ft. (204m)	1000 ft. (303m)	
BATI, RATI	PSU	1000 ft. (303m)	n/a	n/a
	Battery Backup	1000 ft. (303m)	n/a	n/a
DDCB3A	PSU	1000 ft. (303m)	1000 ft. (303m)	1000 ft. (303m)
	Battery Backup	165 ft. (50m)	675 ft. (204m)	1000 ft. (303m)

1. Two-pair wiring or optional telephone power supply is required to achieve maximum range in all cases.
2. BDKS does not provide the power wire pair, an external power supply is required to achieve maximum range (see Figure 6-6).

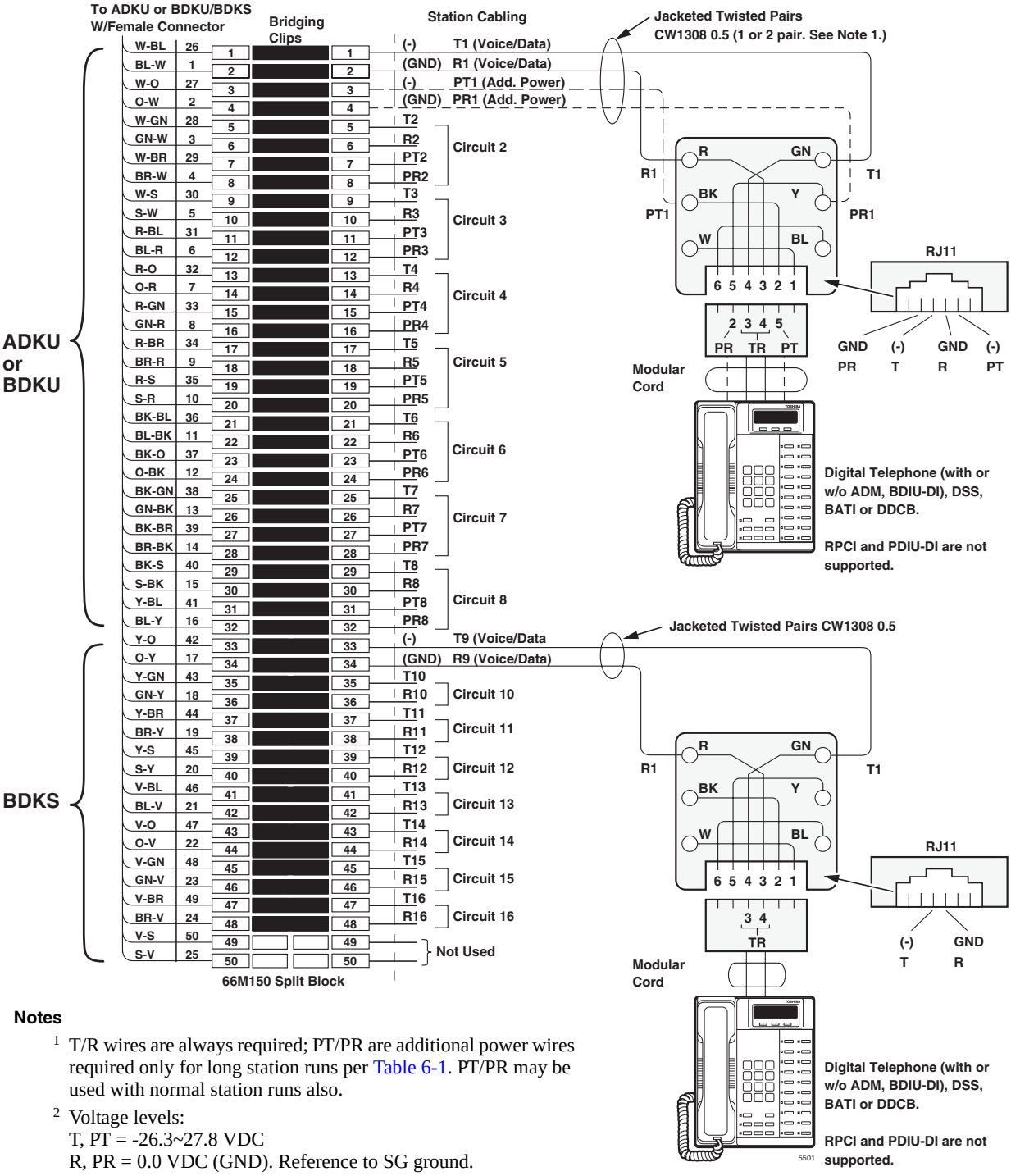
Station Wiring Diagrams



Important! *To protect against transient voltages and currents, solid state secondary protectors must be installed if there is outside wiring, and on all DDI and E&M Tie lines. These protectors, which contain fast semiconductors in addition to fuses, shall comply with the requirements for secondary protectors for communication circuits. Care must be taken to ensure that they are very well grounded to a reliable earth ground. Install and test the secondary protectors precisely to the installation instructions of the manufacturer.*

Figure 6-1 Strata CTX Secondary Protector Diagram

ADKU and BDKU/BDKS Digital Station Wiring



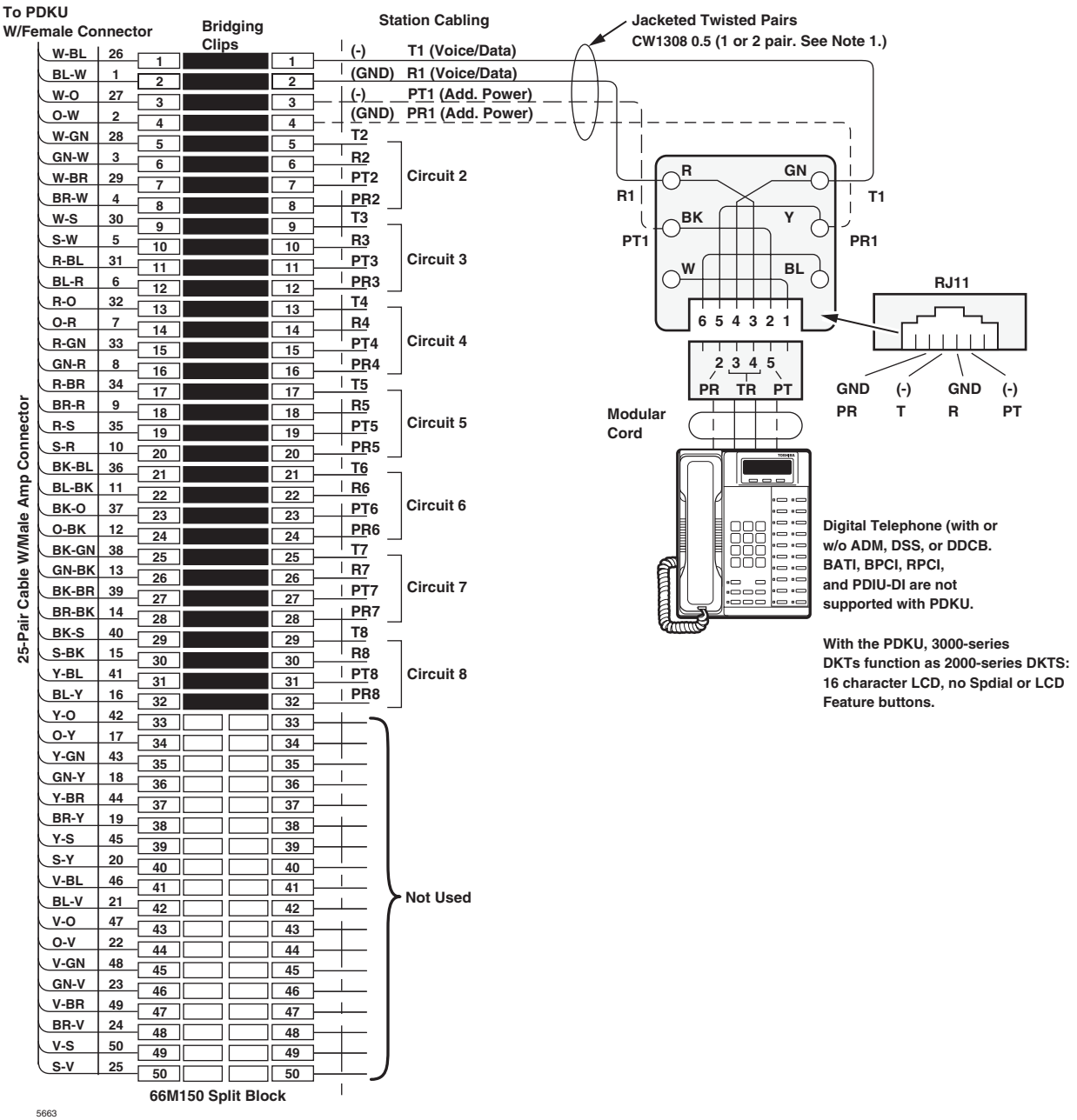
Notes

1 T/R wires are always required; PT/PR are additional power wires required only for long station runs per Table 6-1. PT/PR may be used with normal station runs also.

2 Voltage levels:
T, PT = -26.3~27.8 VDC
R, PR = 0.0 VDC (GND). Reference to SG ground.

Figure 6-2 ADKU and BDKU/BDKS (DKT, DDCB, ADM, DDS, BATI, BDIU-DI) Wiring

PDKU Digital Station Wiring

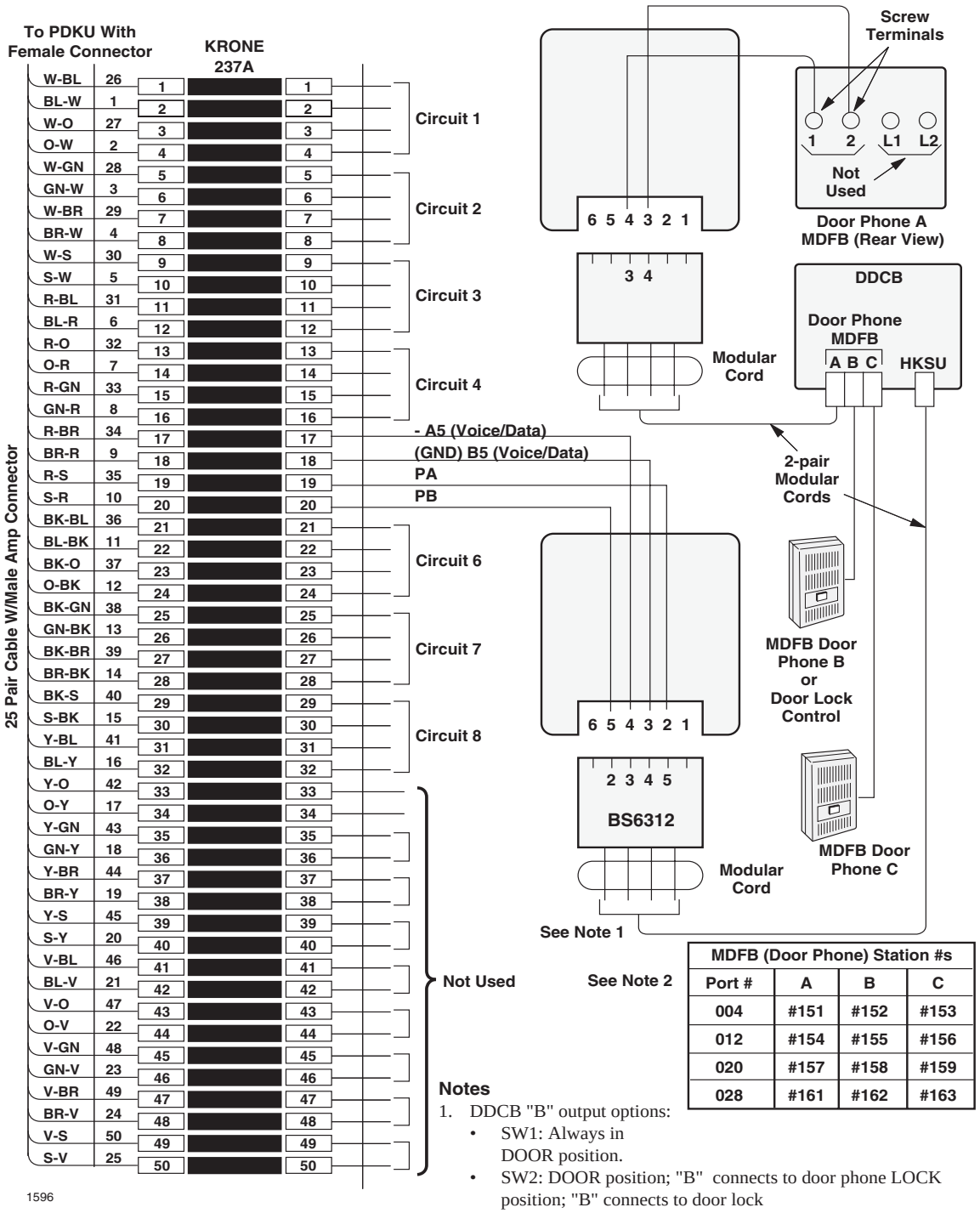


Notes

1 T/R wires are always required; PT/PR are additional power wires required only for long station runs per Table 6-1. PT/PR may be used with normal station runs also.

Voltage levels:
T, PT = -26.3~27.8 VDC
R, PR = 0.0 VDC (GND). Reference to SG ground.

Figure 6-3 PDKU Wiring



MDFB (Door Phone) Station #s			
Port #	A	B	C
004	#151	#152	#153
012	#154	#155	#156
020	#157	#158	#159
028	#161	#162	#163

Notes

1. DDCB "B" output options:
   - SW1: Always in DOOR position.
   - SW2: DOOR position; "B" connects to door phone LOCK position; "B" connects to door lock
2. Door phones may only be connected to circuit 5 on ports 04, 012, 020, and 028 only.

Figure 6-4 MDF Wiring-DDCB/Door Phone/Lock to PDKU

MDF Block Number _____ **KSU Slot Number** _____

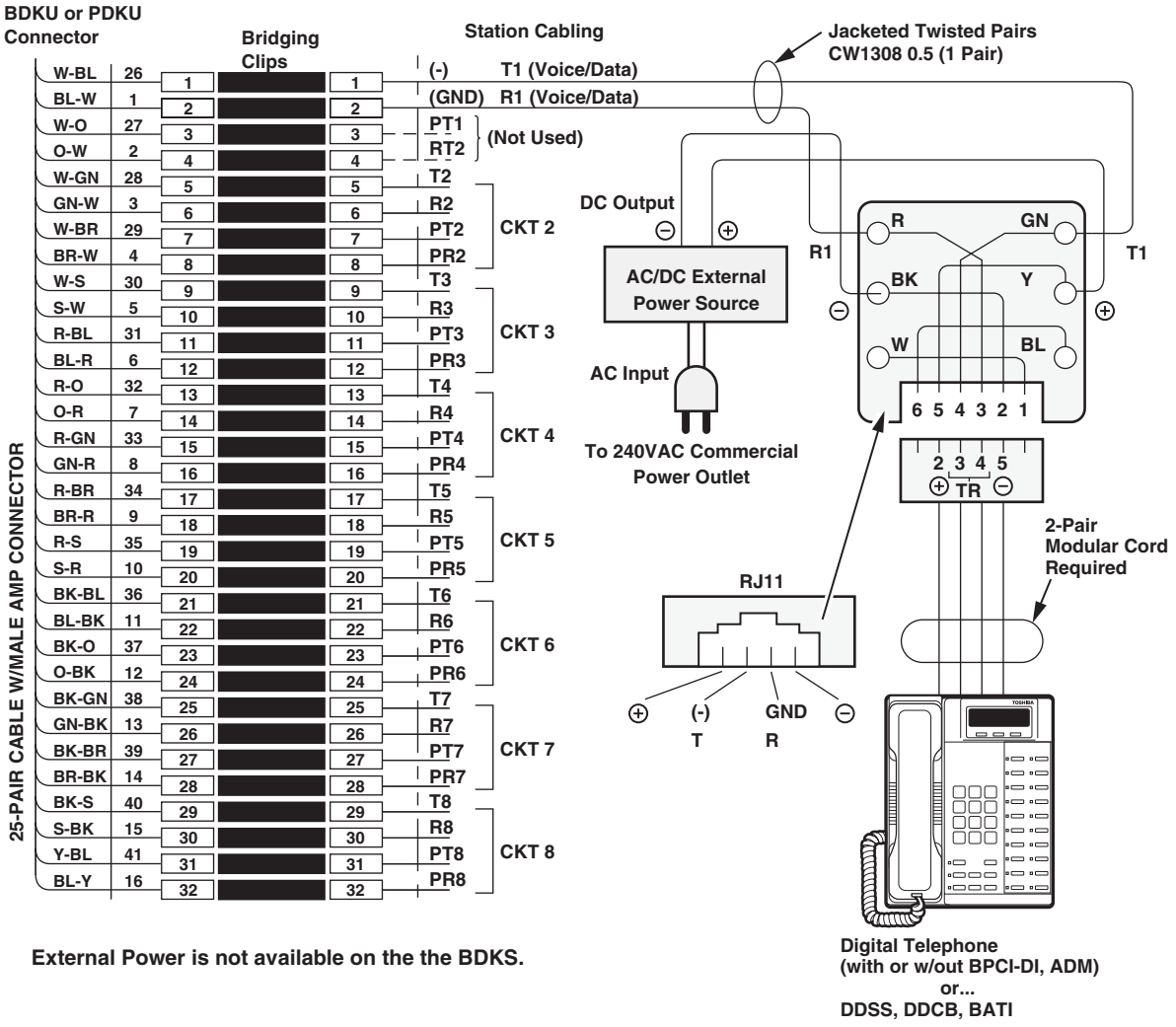
Colour Code	Designation	CCT Number	Port Number	Intercom Number	Device/Standard Telephone/Electronic Telephone Location
W-Bl	A	1			
Bl-W	B				
W-O	PWR-A				
O-W	PWR-B				
W-G	A	2			
G-W	B				
W-Br	PWR-A				
Br-W	PWR-B				
W-S	A	3			
S-W	B				
R-Bl	PWR-A				
Bl-R	PWR-B				
R-O	A	4			
O-R	B				
R-G	PWR-A				
G-R	PWR-B				
R-Br	A	5[1]			
Br-R	B				
R-S	PWR-A				
S-R	PWR-B				
Bk-Bl	A	6			
Bl-Bk	B				
Bk-O	PWR-A				
O-Bk	PWR-B				
Bk-G	A	7			
G-Bk	B				
Bk-Br	PWR-A				
Br-Bk	PWR-B				
Bk-S	A	8			
S-Bk	B				
Y-Bl	PWR-A				
Bl-Y	PWR-B				

1. DDCBs connect only to Circuit 5, Ports 004, 012, 020, and 028.

Note Indicate if digital telephone (with or without PCIU), DSS console (number 1~3), or DDCB is connected.

Figure 6-5 PDKU Station MDF Cross Connect Record

Digital Telephone DSS and DDCB External Power Connection



External Power is not available on the the BDKS.

AC/DC External Power Source Specifications:

AC IN: **240VAC ± 10%**
DC OUT: **24VDC ± 10%**
160 MA (Min.) DC Current
200 MV P-P (Max) AC Ripple On DC Output

AC/DC power supplies that meet the above requirements are available from most telephone equipment supply houses.

External Power Straps:

If the external power is installed, cut the external power straps located inside the digital telephone DDSS, DDCB.

See Loop Limits in Table 6-1 at the front of this section for external power requirements.

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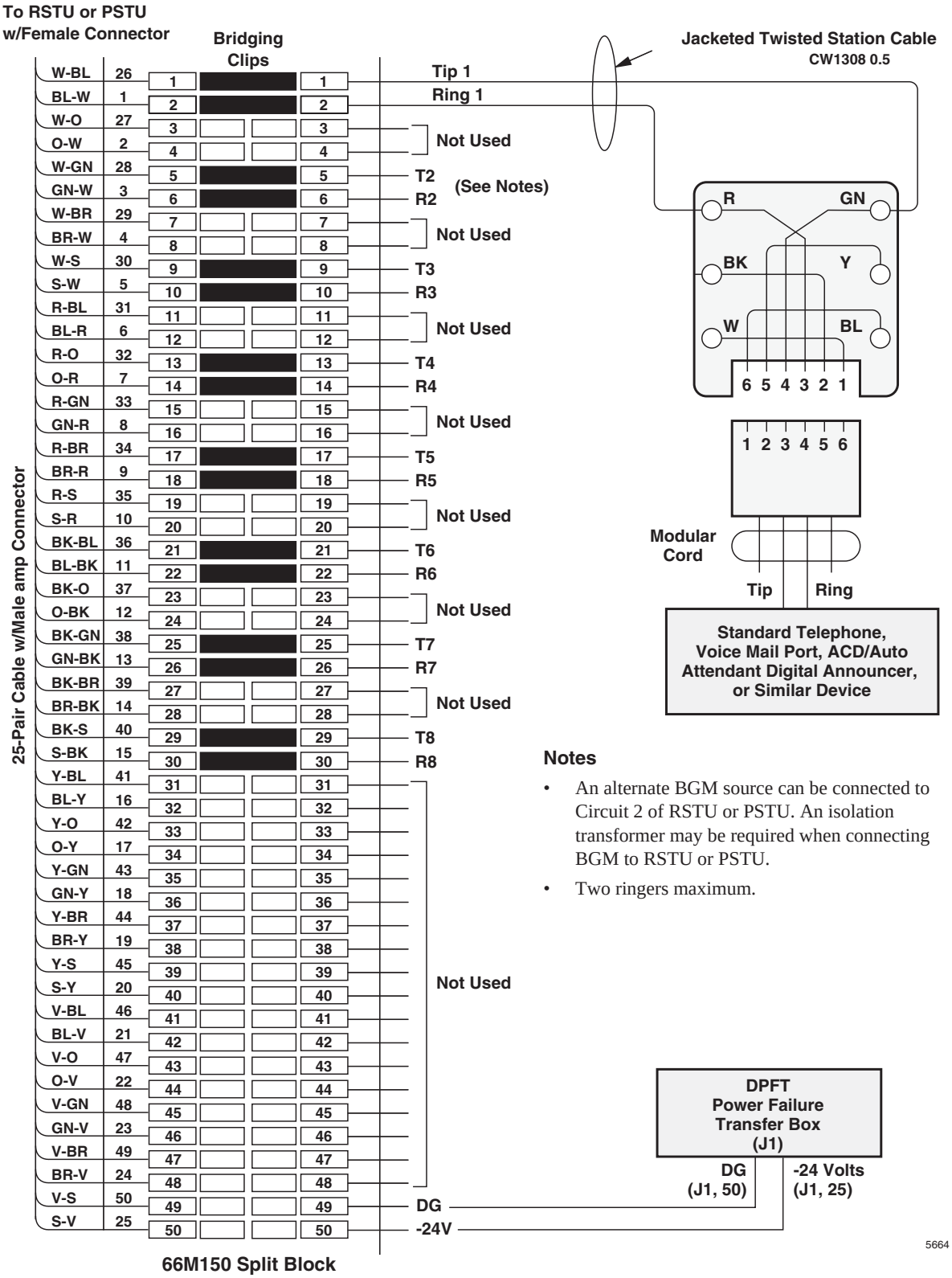
Figure 6-6 Digital Telephone DSS and DDCB External Power Connection

MDF Block Number _____ **KSU Slot Number** _____

Colour Code	Designation	CKT	PDN	Intercom	Device/Standard Telephone	
W-Bl	T	1				ADKU, BDKU or PDKU
Bl-W	R					
W-O	PRW-T					
O-W	PRW-R					
W-G	T	2				
G-W	R					
W-Br	PRW-T					
Br-W	PRW-R					
W-S	T	3				
S-W	R					
R-Bl	PRW-T					
Bl-R	PRW-R					
R-O	T	4				
O-R	R					
R-G	PRW-T					
G-R	PRW-R					
R-Br	T	5				
Br-R	R					
R-S	PRW-T					
S-R	PRW-R					
Bk-Bl	T	6				
Bl-Bk	R					
Bk-O	PRW-T					
O-Bk	PRW-R					
Bk-G	T	7				
G-Bk	R					
Bk-Br	PRW-T					
Br-Bk	PRW-R					
Bk-S	T	8				
S-Bk	R					
Y-Bl	PRW-T					
Bl-Y	PRW-R					
Y-O	T	9				BDKS
O-Y	R					
Y-GN	T	10				
GN-Y	R					
Y-BR	T	11				
BR-Y	R					
Y-S	T	12				
S-Y	R					
V-BL	T	13				
BL-V	R					
V-O	T	14				
O-V	R					
V-GN	T	15				
GN-V	R					
V-BR	T	16				
BR-V	R					

Figure 6-7 BDKU Station MDF Cross Connect Record

RSTU or PSTU Analogue Devices Wiring



Notes

- An alternate BGM source can be connected to Circuit 2 of RSTU or PSTU. An isolation transformer may be required when connecting BGM to RSTU or PSTU.
- Two ringers maximum.

Figure 6-8 RSTU or PSTU Wiring

MDF Block Number | | **KSU Slot Number** | |

Colour Code	Designation	CKT Number	Port Number	Intercom Number	Device/Standard Telephone Location
W-Bl	T	1			
Bl-W	R				
W-O	Not Used				
O-W	Not Used				
W-G	T	2			Indicate if separate BGM source.
G-W	R				
W-Br	Not Used				
Br-W	Not Used				
W-S	T	3			
S-W	R				
R-Bl	Not Used				
Bl-R	Not Used				
R-O	T	4			
O-R	R				
R-G	Not Used				
G-R	Not Used				
R-Br	T	5			
Br-R	R				
R-S	Not Used				
S-R	Not Used				
Bk-Bl	T	6			
Bl-Bk	R				
Bk-O	Not Used				
O-Bk	Not Used				
Bk-G	T	7			
G-Bk	R				
Bk-Br	Not Used				
Br-Bk	Not Used				
Bk-S	T	8			
S-Bk	R				
Y-Bl	Not Used				
Bl-Y	Not Used				
V-S	Data Ground	N/A	N/A	N/A	DPFT – Power Failure Transfer Box
S-V	-24VDC				

Note Indicate if standard telephone, voice mail port, etc.

Figure 6-9 RSTU/RSTU2/RDSU/RSTS/PSTU/PSTU2 Station MDF Cross Connect Record

Power Failure Cut Through (DPFT) Wiring Pin-outs

Pair	Pin	Colour Code	Lead Designation	Function		PSTU/RSTU PCB Position
1t	26	W-Bl	T	TIP-TEL	#1	
R	1	Bl-W	R	RING-TEL	#1	
2T	27	W-O	T	TIP-RSTU/RSTU/RDSU	#1	
R	2	O-W	R	RING-PSTU/RSTU/RDSU	#1	
3T	28	W-G	T	TIP-TEL	#2	
R	3	G-W	R	RING-TEL	#2	
4T	29	W-Br	T	TIP-RSTU/RSTU/RDSU	#2	
R	4	Br-W	R	RING-PSTU/RSTU/RDSU	#2	
5T	30	W-S	T	TIP-TEL	#3	
R	5	S-W	R	RING-TEL	#3	
6T	31	R-Bl	T	TIP-RSTU/RSTU/RDSU	#3	
R	6	Bl-R	R	RING-PSTU/RSTU/RDSU	#3	
7T	32	R-O	T	TIP-TEL	#4	
R	7	O-R	R	RING-TEL	#4	
8T	33	R-G	T	TIP-RSTU/RSTU/RDSU	#4	
R	8	G-R	R	RING-PSTU/RSTU/RDSU	#4	
9T	34	R-Br	T	TIP-TEL	#5	
R	9	Br-R	R	RING-TEL	#5	
10T	35	R-S	T	TIP-RSTU/RSTU/RDSU	#5	
R	10	S-R	R	RING-PSTU/RSTU/RDSU	#5	
11T	36	Bk-Bl	T	TIP-TEL	#6	
R	11	Bl-Bk	R	RING-TEL	#6	
12T	37	Bk-O	T	TIP-RSTU/RSTU/RDSU	#6	
R	12	O-Bk	R	RING-PSTU/RSTU/RDSU	#6	
13T	38	Bk-G	T	TIP-TEL	#7	
R	13	G-Bk	R	RING-TEL	#7	
14T	39	Bk-Br	T	TIP-RSTU/RSTU/RDSU	#7	
R	14	Br-Bk	R	RING-PSTU/RSTU/RDSU	#7	
15T	40	Bk-S	T	TIP-TEL	#8	
R	15	S-Bk	R	RING-TEL	#8	
16T	41	Y-Bl	T	TIP-RSTU/RSTU/RDSU	#8	
R	16	Bl-Y	R	RING-PSTU/RSTU/RDSU	#8	
17T	42	Y-O	Spare			
R	17	O-Y	Spare			
18T	43	Y-G	Spare			
R	18	G-Y	Spare			
19T	44	Y-Br	Spare			
R	19	Br-Y	Spare			
20T	45	Y-S	Spare			
R	20	S-Y	Spare			
21T	46	V-Bl	Spare			
R	21	Bl-V	Spare			
22T	47	V-O	Spare			
R	22	O-V	Spare			
23T	48	V-G	Spare			
R	23	G-V	Spare			
24T	49	V-Br	Spare			
R	24	Br-V	Spare			
25T	50	V-S	Spare			
R	25	S-V	Spare			

Figure 6-10 DPFT Connector J2/Terminal Sequence & Designations/Station Line Connection

Pair	Pin	Colour Code	Lead Designation	Function	PSTU/RSTU PCB Position
1t	26	W-Bl	T	TIP-EXCHANGE #1	
R	1	Bl-W	R	RING-EXCHANGE #1	
2T	27	W-O	T	TIP-PCOU/RCOU #1	
R	2	O-W	R	RING-PCOU/RCOU #1	
3T	28	W-G	T	TIP-EXCHANGE #2	
R	3	G-W	R	RING-EXCHANGE #2	
4T	29	W-Br	T	TIP-PCOU/RCOU #2	
R	4	Br-W	R	RING-PCOU/RCOU #2	
5T	30	W-S	T	TIP-EXCHANGE #3	
R	5	S-W	R	RING-EXCHANGE #3	
6T	31	R-Bl	T	TIP-PCOU/RCOU #3	
R	6	Bl-R	R	RING-PCOU/RCOU #3	
7T	32	R-O	T	TIP-EXCHANGE #4	
R	7	O-R	R	RING-EXCHANGE #4	
8T	33	R-G	T	TIP-PCOU/RCOU #4	
R	8	G-R	R	RING-PCOU/RCOU #4	
9T	34	R-Br	T	TIP-EXCHANGE #5	
R	9	Br-R	R	RING-EXCHANGE #5	
10T	35	R-S	T	TIP-PCOU/RCOU #5	
R	10	S-R	R	RING-PCOU/RCOU #5	
11T	36	Bk-Bl	T	TIP-EXCHANGE #6	
R	11	Bl-Bk	R	RING-EXCHANGE #6	
12T	37	Bk-O	T	TIP-PCOU/RCOU #6	
R	12	O-Bk	R	RING-PCOU/RCOU #6	
13T	38	Bk-G	T	TIP-EXCHANGE #7	
R	13	G-Bk	R	RING-EXCHANGE #7	
14T	39	Bk-Br	T	TIP-PCOU/RCOU #7	
R	14	Br-Bk	R	RING-PCOU/RCOU #7	
15T	40	Bk-S	T	TIP-EXCHANGE #8	
R	15	S-Bk	R	RING-EXCHANGE #8	
16T	41	Y-Bl	T	TIP-PCOU/RCOU #8	
R	16	Bl-Y	R	RING-PCOU/RCOU #8	
17T	42	Y-O	Spare		
R	17	O-Y	Spare		
18T	43	Y-G	Spare		
R	18	G-Y	Spare		
19T	44	Y-Br	Spare		
R	19	Br-Y	Spare		
20T	45	Y-S	Spare		
R	20	S-Y	Spare		
21T	46	V-Bl	Spare		
R	21	Bl-V	Spare		
22T	47	V-O	Spare		
R	22	O-V	Spare		
23T	48	V-G	Spare		
R	23	G-V	Spare		
24T	49	V-Br	Spare		
R	24	Br-V	Spare		
25T	50	V-S	PFT DG	PFT GROUND (INPUT)	RDSU/RSTU/PSTU/PIN50
R	25	S-V	PFT -24V	PFT -24V (INPUT)	RDSU/RSTU/PSTU/PIN25

Figure 6-11 DPFT Connector J1/Terminal Sequence & Designations/Exchange Line Connection & DPFT Control

Exchange Line Wiring Diagrams

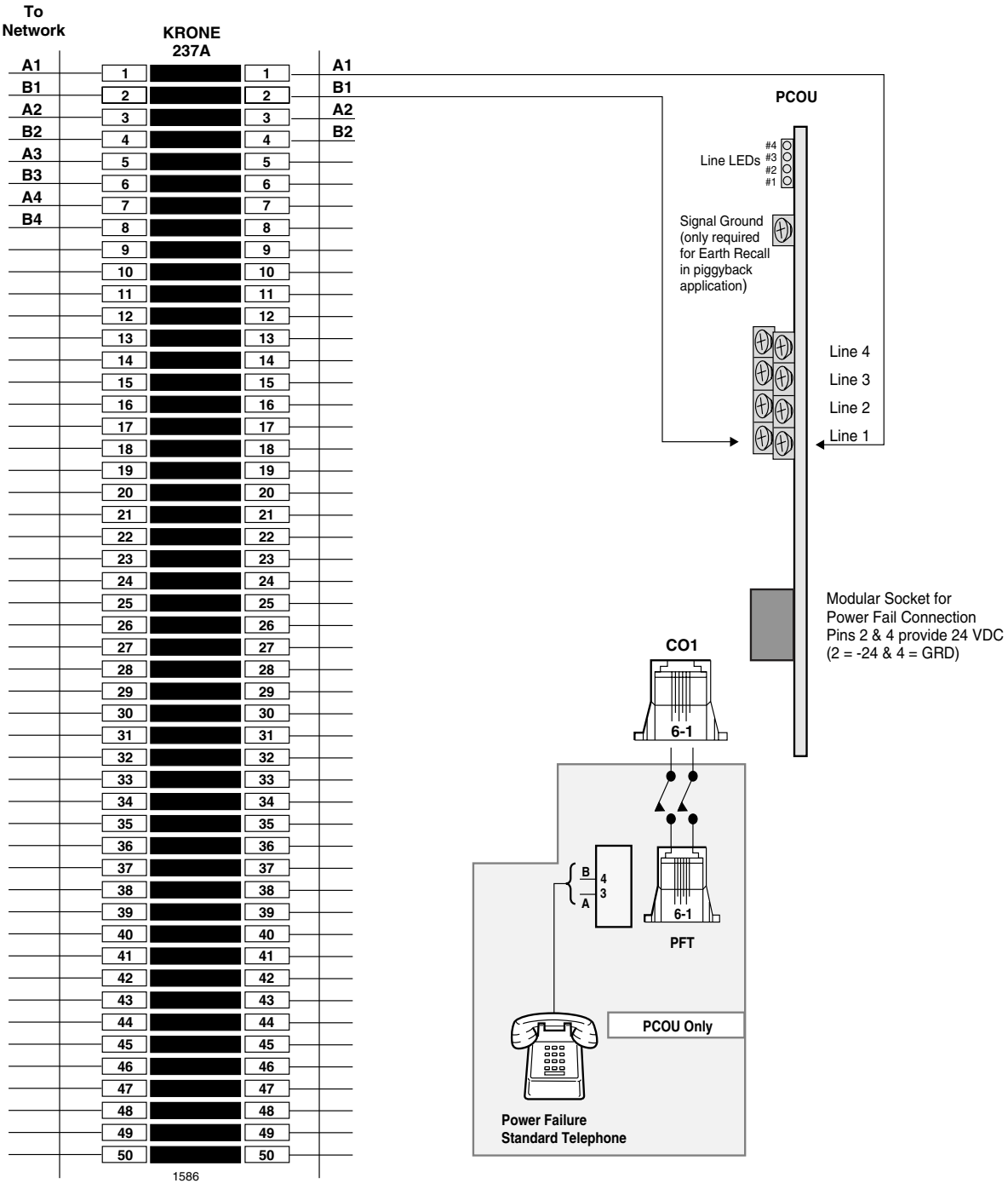


Figure 6-12 MDF Wiring/Exchange Lines to PCOU

RCOU/RCOS Wiring

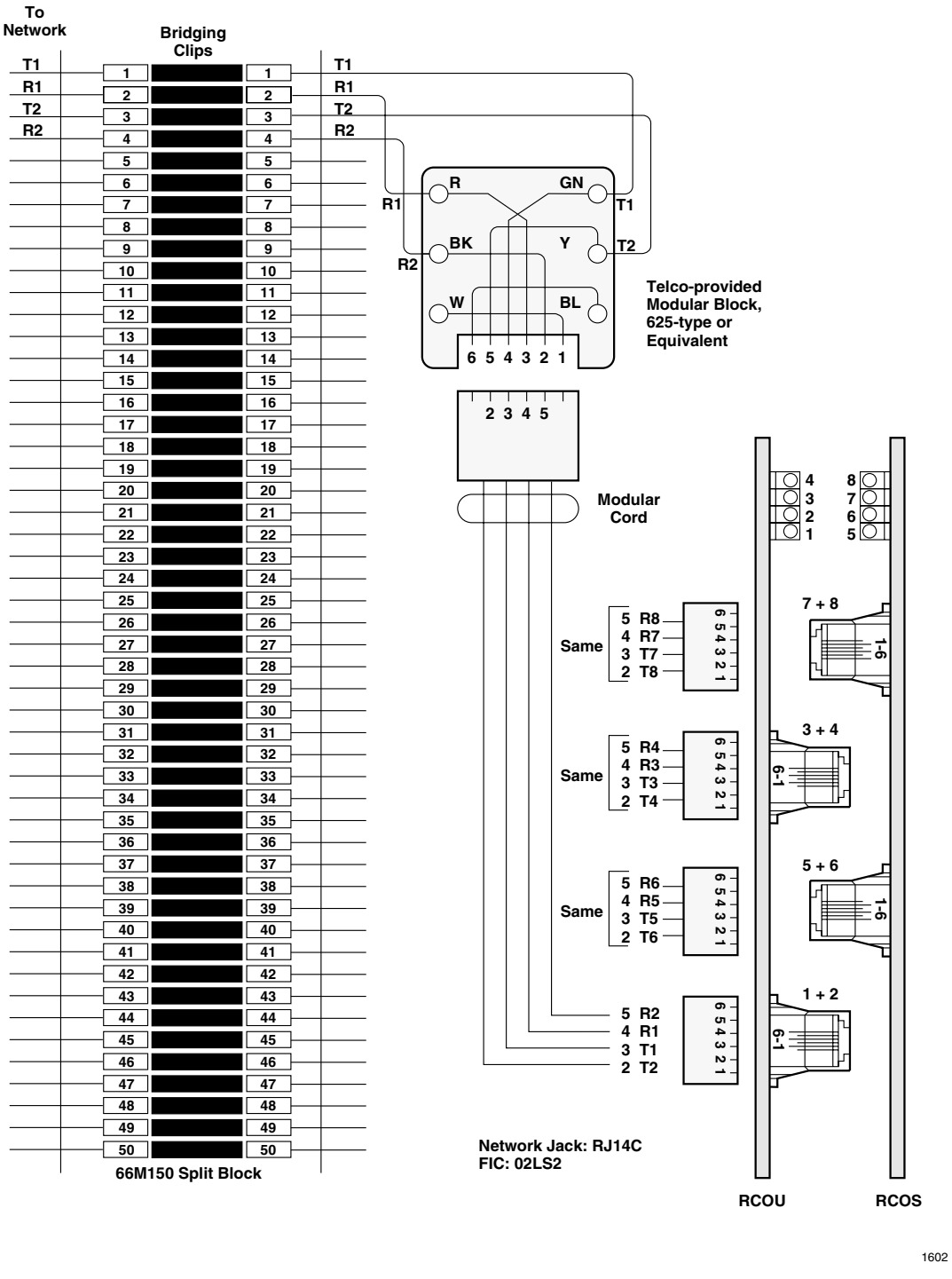


Figure 6-13 Exchange to RCOU Wiring

MDF Block Number	Exchange Line Number	PCB Type and Cabinet Slot Number	MDF Block Number	Exchange Line Number	PCB Type and Cabinet Slot Number	MDF Block Number	Exchange Line Number	PCB Type and Cabinet Slot Number

Figure 6-14 Exchange Line (RCOU/RCOS, PEMU, REMU) MDF Cross Connect Record

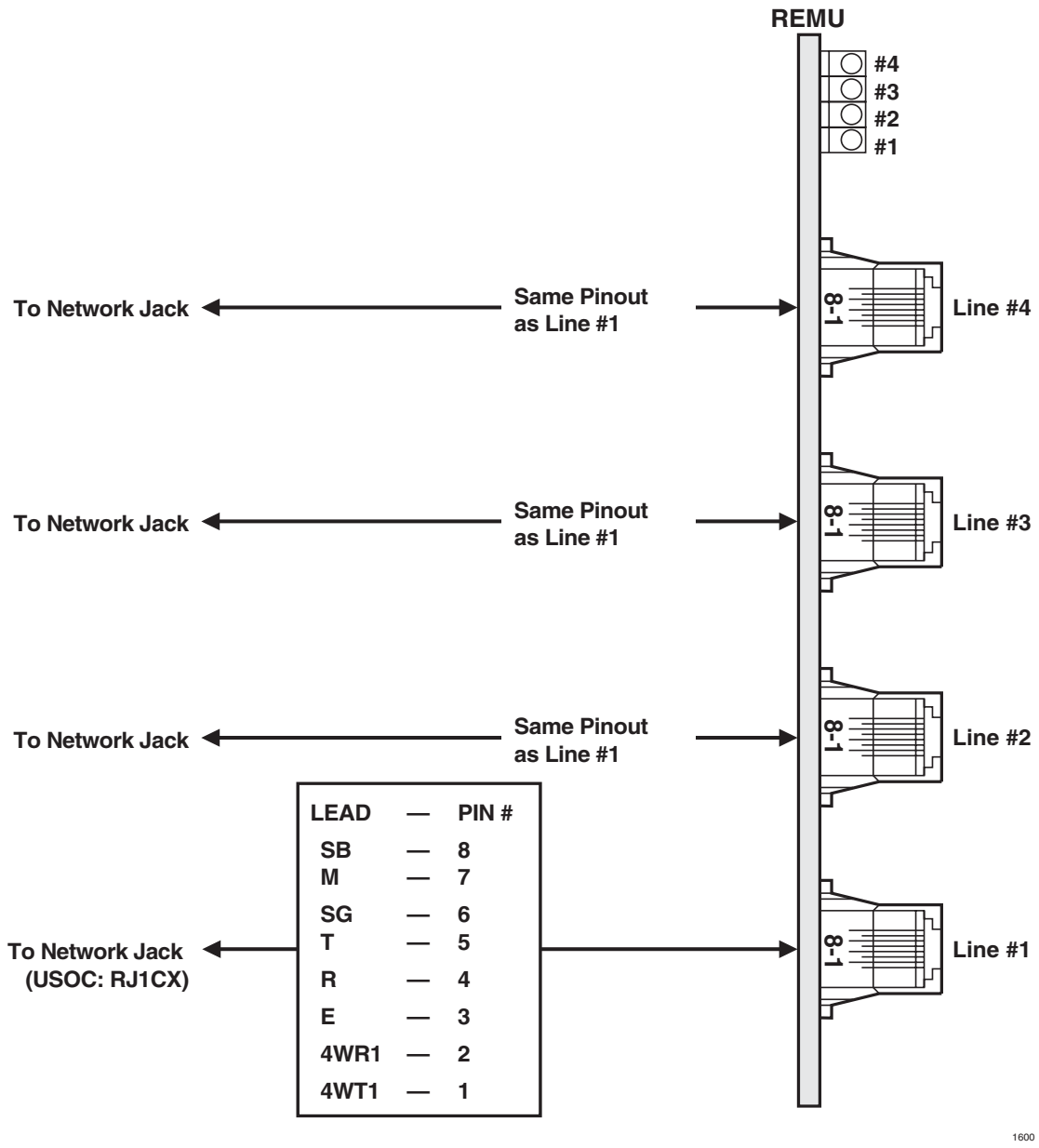


Figure 6-15 MDF Wiring REMU 2/4 Wire Type I/II

PEMU Wiring

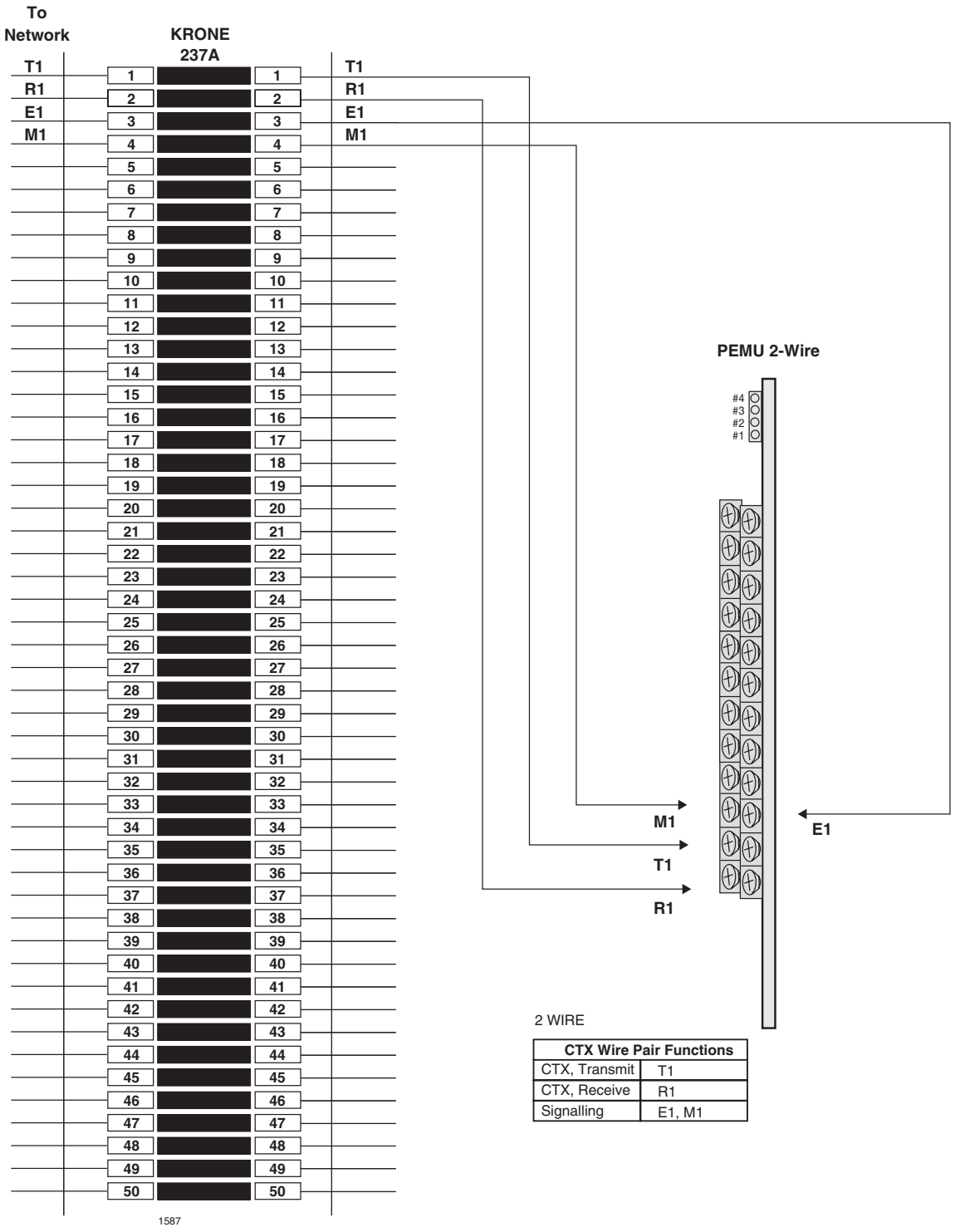


Figure 6-16 MDF Wiring/2-Wire Tie Line to PEMU

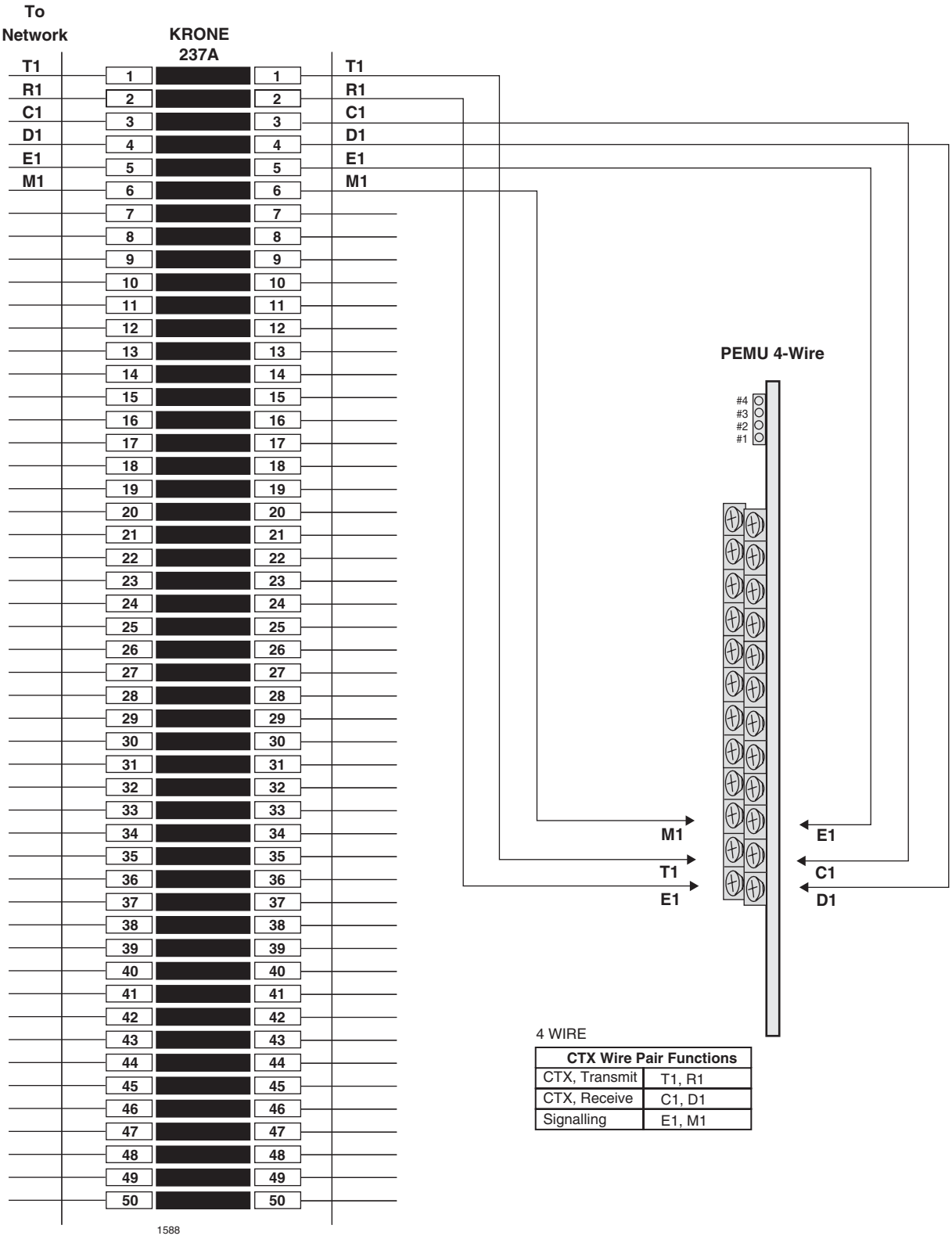


Figure 6-18 MDF Wiring/4-Wire Tie Line to PEMU

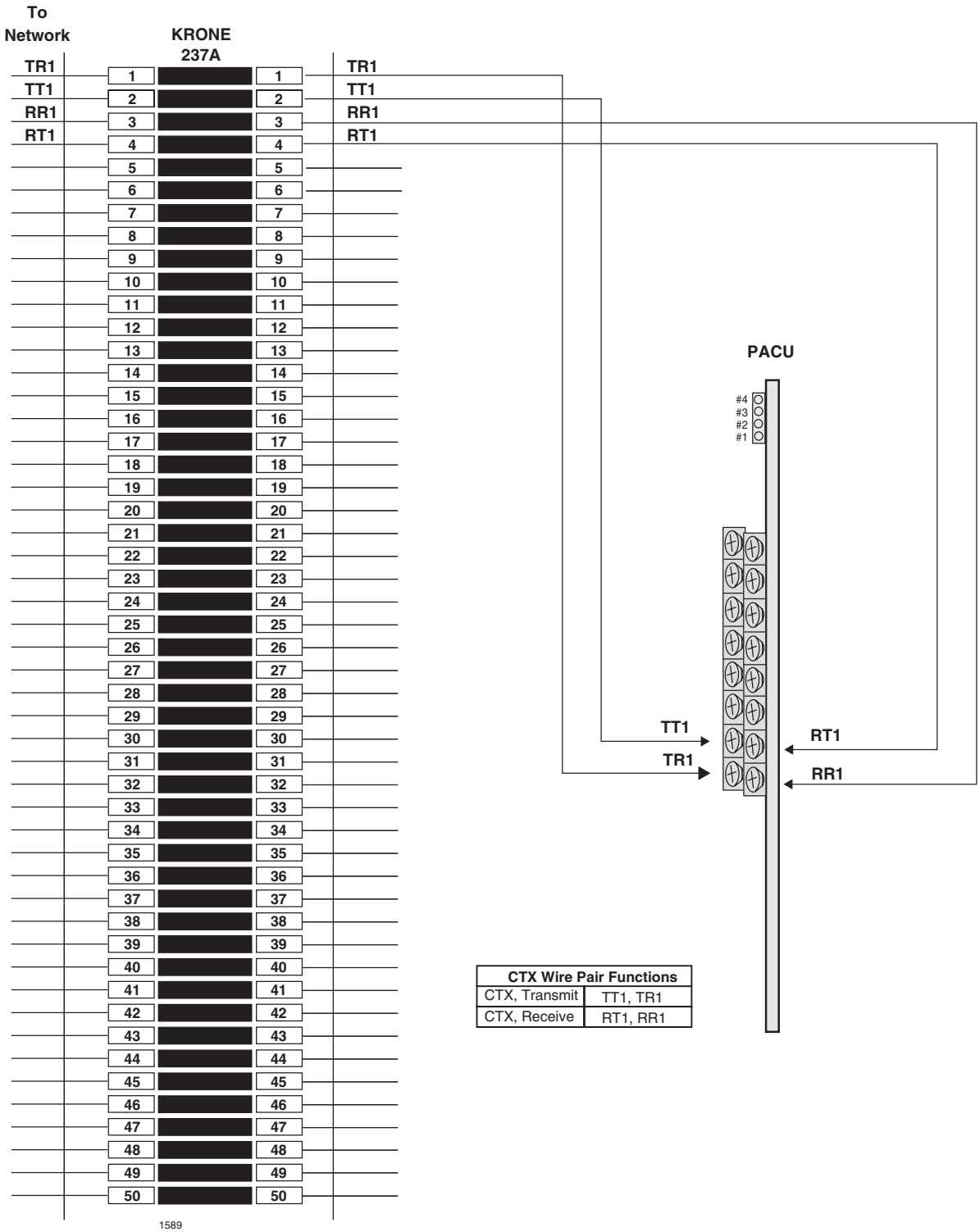


Figure 6-19 MDF Wiring AC15 Tie Lines to PACU

Option Interface PCB Wiring Diagram

This section covers wiring for the option interface PCB, the BIOU, which enables external paging, Night Bell, Night Transfer, Door Lock and BGM mute control. For more information and connection diagrams, see "External Page with BIOU Interface" on Page 8-10.

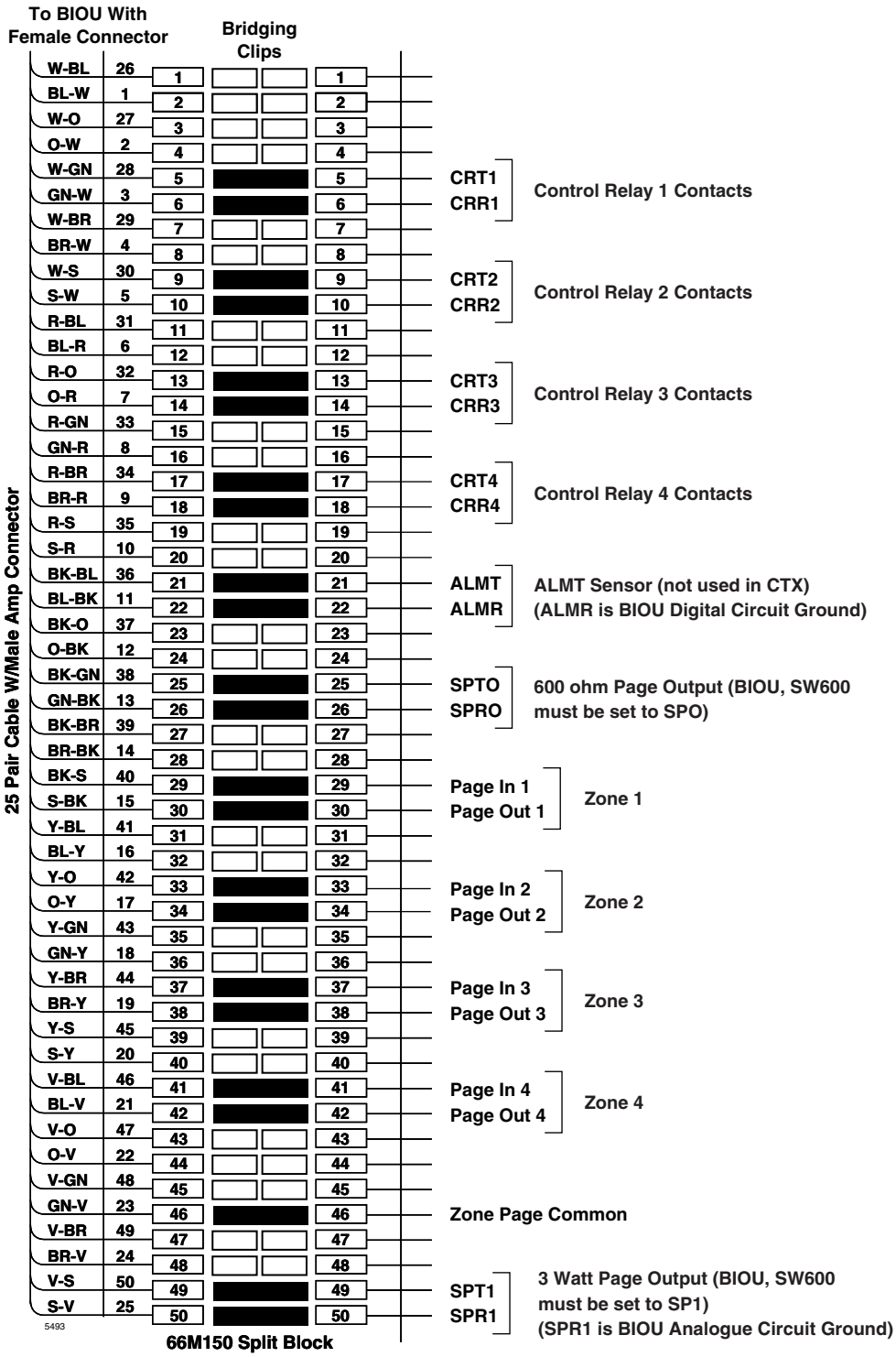


Figure 6-20 MDF Wiring to BIOU

Station Apparatus 7

This chapter provides instructions on how to connect telephones to the Strata CTX systems and how to configure and upgrade them for optional features.

The Strata CTX systems can support Toshiba corded and cordless digital telephones, as well as most standard telephones provided by other suppliers. The digital telephone information in this chapter applies to the 3000/3500*-series and 2000/2500*-series telephones that connect to the PDKU, ADKU or BDKU/BDKS interface.

Strata CTX does not support Toshiba electronic telephones (EKT) or other devices supported by the PEKU and PESU interface PCBs. For information on earlier models, refer to the appropriate *Strata DK manual.* Procedures for installing direct station selection consoles and add-on modules also appear in this chapter.

* **Please note where the term 3000-series is quoted this applies to the DKT3500-series. Where the term 2000-series is quoted this applies to the DKT2500-series.**

3000/3500-series Digital Telephones

The 3000/3500-series digital telephone (DKT) models consist of:

1. DKT3010-S (10-button speakerphone model which enables users to make and receive outside and internal calls without lifting the handset.)
2. DKT3020-S (20-button speakerphone model which enables users to make and receive outside and internal calls without lifting the handset.)
3. DKT3010-SD (10-button speakerphone model equipped with an LCD that displays two rows of 24-characters. The speakerphone enables users to make and receive outside and internal calls without lifting the handset.)
4. DKT3020-SD (20-button speakerphone model equipped with an LCD that displays two rows of 24-characters. The speakerphone enables users to make and receive outside and internal calls without lifting the handset.)
5. DKT3014-SDL (14-button speakerphone model equipped with 16 buttons for LCD soft keys and a large LCD. The large LCD accommodates up to eight rows of 24 characters on a screen which tilts for easy viewing.The speakerphone enables users to make and receive outside and internal calls without lifting the handset.)
6. DKT3001 (single line, digital telephone that enables users to make and receive outside and internal calls using the handset.)
7. DKT3512-S (12-button speakerphone model which enables users to make and receive outside and internal calls without lifting the handset.)
8. DKT3512-SD (12-button speakerphone model equipped with an LCD that displays two rows of 24-characters. The speakerphone enables users to make and receive outside and internal calls without lifting the handset.)
9. DKT3524-S (24-button speakerphone model which enables users to make and receive outside and internal calls without lifting the handset.)
10. DKT3524-SD (24-button speakerphone model equipped with an LCD that displays two rows of 24-characters. The speakerphone enables users to make and receive outside and internal calls without lifting the handset.)

Telephone Installation

Digital Telephone System Connection

The following provides information on how to connect all 3000/3500-series DKTs to the Strata CTX systems. 3000/3500-series DKTs can be connected to the BDKU/BDKS and/or the PDKU interface PCB. To obtain all capabiltities, the DKT3000/3500-series telephone must be connected to the BDKU/BDKS. For details on feature availability per station PCB, see Table 7-1.

Table 7-1 DKT3000/3500 Operation with Strata CTX and DK Systems

DKT3000/3500 Telephone and Feature	Strata CTX System with BDKU/BDKS	Strata CTX system w/ PDKU and DK System w/ PDKU or BDKU
DKT3020/3010/3512/3524 Basic LCD	2 x 24 characters	2 x 16 characters, left-justified
DKT3014 Large LCD	8 x 24 characters with VM and Directory Dial softkeys	2 x 16 characters, left-justified, no VM and Directory Dial softkeys
LCD **Feature** button	Operational	Not operational
Fixed **Spdial** button	Operational	Not operational
DKT3000/3500 telephones per cabinet slot	16 telephones max.	8 telephones max.
DKT3000/3500 Programming Mode “A” (Beep Tone On/Off, etc.) Program Mode “A” is for telephone options that are controlled by the ROM inside the telephone.	Operational	Operational
DKT3000/3500 Programming Mode “B” (Flexible Buttons, One Touch, etc.) Program Mode “B” is for telephone options controlled by the Strata CTX670 processor and database memory. (See the *Strata CTX DKT3000/3500/2000/2500-series Digital Telephone User Guide*.)	Operational	Strata CTX with PDKU is operational. DK system with PDKU or BDKU is not operational.

Before installing any telephone wiring, read the following warning and caution notes:

WARNING!

- **Never install the telephone wiring during a lightning storm.**
- **Never install the telephone jacks in wet locations, unless the jack is specifically designed for wet locations.**
- **Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.**
- **Use caution when installing or modifying telephone lines.**
- **If telephone, DSS console, door phone control box, or door phone wiring exits the building, external secondary protection is required. See Chapter 6 – MDF PCB Wiring.**

CAUTION! When installing the station cable, do not run the cables parallel if they are within three feet of an AC power line. AC power lines should be crossed at right (90◦) angles only. In particular, avoid running station wire pairs near devices that generate electrical noise, such as neon or fluorescent light fixtures.

CAUTION! Avoid using cleansers that contain benzene, paint thinner or alcohol on the rubber feet. The color of the rubber may transfer to the desk or mounting surface. If you do use this type of cleanser on the desk or mounting surface, wipe it with a cloth and make sure that it is completely dry.

Digital telephones connect to the digital telephone ports via the MDF with standard twisted-pair jacketed telephone cable. If using CW1308 0.5 cable, single-pair wiring is sufficient in most cases for digital telephones to operate effectively at up to 1000 feet from the system.

Digital telephones that are equipped with ADMs should have two-pair (or external power) to function effectively at this distance. This also applies to digital telephones supported by systems that must operate with battery reserve power (see Chapter 3 – Strata CTX670 Installation for more information).

To accommodate the digital telephone line cord, the cable should be terminated in a modular station connector block (RJ11) at the station location. The standard single-pair, modular digital telephone cord that is sent with the telephone is 2.1m (7 ft.) (the maximum allowed is 7.6m or 25 ft.).

Notes

- *Digital telephone cable runs must not have cable splits (single or double), cable bridges (of any length), or high resistance or faulty cable splices.*

3000/3500-series Telephone Option PCBs

Digital telephones can be upgraded with option PCBs to add a number of features. Each of these upgrades shares a circuit with the telephone that it is connected to and is not considered a station. See Table 7-2 for more information.

Table 7-2 3000/3500 Telephone Subassembly Upgrades

Subassembly	No. per Phone	Function
BVSU[1]	1	**Speaker Off-hook Call Announce (OCA):** Provides interface for digital telephone to receive Speaker OCA. Not required for Handset/Headset OCA.
BHEU or HHEU	1	**Headset and external ringer telephone interface**: Can be installed with BVSU, BPCI or DADM. (Installation instructions are in Chapter 8 – Peripheral Installation, see "Telephone (BHEU) to External Speaker (HESB) Cable Connection" on Page 8-18.
BPCI	1	**TAPI PC application and data calling interfaces.**
DADM3020[1]	1 or 2	**Add-on Module (ADM):** Provides telephone with 20 (or 40 with two ADMs) additional feature buttons. DKT3500-series can only support 1ADM.

1. Only one of these options is allowed per telephone: BVSU, BPCI or DADM.

Some of the option PCBs are compatible, meaning that more than one option can be added to a telephone. The following table shows which options are compatible.

Table 7-3 Station Option Interface PCB Compatibility

Item	BPCI	BHEU/ HHEU	BVSU	ADM
BPCI		X	NC	NC
BHEU/HHEU	X		X	X
BVSU	NC	X		NC
ADM	NC	X	NC	

X = Compatible, can be used together in the same telephone.

NC = Not compatible, cannot be used together in the same telephone.

Option PCBs must be compatible with type of telephone (i.e., 3000/3500- or 2000/2500-series) they are installed in (see Table 7-4 for compatibility).

Table 7-4 DKT3000/3500 and DKT2000/2500 Component Compatibility

Item	2000/2500-series DKT	3000/3500-series DKT
Add-on Modules	DADM2020 only	DADM3020 only
Desktop Computer Telephony Interface (CTI)	n/a	BPCI only
Speaker OCA	BVSU or DVSU	BVSU only
Tilt Stands	BTSD for DKT	♦ DKT3000 BTSD for DKT and BTSA for DKT with ADM(s) ♦ DKT3500 BTSD for DKT
Item	**2000/2500- and 3000/3500-series DKTs**	
Headset Interface	HHEU2 and BHEU	
External Ringer	HHEU2/HESB and BHEU/HESB	
Cordless Telephones*	DKT2104 and DKT2004. When these cordless telephones are connected to a DKT3000/3500, the DKT3000/3500 must be placed in DKT2000/2500 mode (see “DKT2000/2500 Mode On/Off” on Page 7-17).	

* Not available in U.K/Europe.

Telephone Speaker Off-hook Call Announce Upgrade (BVSU)

To receive Speaker Off-hook Call Announce (OCA) calls over the digital telephone speaker, a digital telephone must be upgraded with a BVSU; the telephone making the call does not require a BVSU. Digital telephones do not require an additional wire pair to receive Speaker OCA call.

Notes

- BVSU is not necessary to receive handset OCA.

BVSU Upgrade Installation

1. Loosen the four captive screws on the telephone base and remove the base (see Figure 7-2).
2. On the BVSU see FigXXX below, set strip pins SW1 and SW2 per the table below:

Control/Indicator/Connector	Type of Component	Description
SW1	6-terminal jumper plug	30 (default) - use for DKT3000 telephones. 20 Mu - use for DKT2000 telephones in Mu Law countries, including US and Canada. 20A - uses for DKT2000 in A Law countries.
SW2	3-terminal jumper plug	SPF (default setting). Use for all DKT3000 DKT2000 telephones, except the DKT2010-H. HFU - use for DKT200_H telephones.

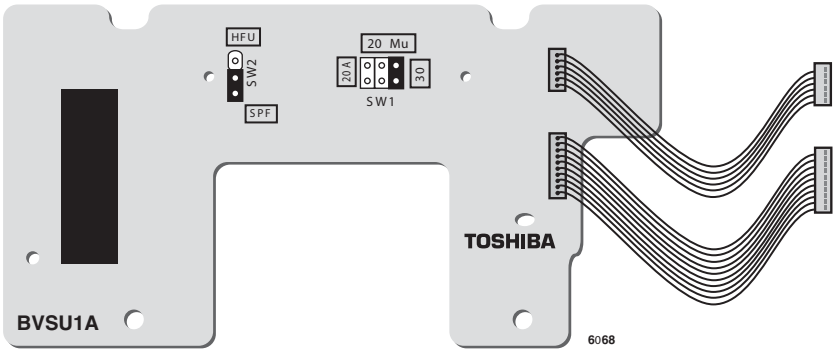


Figure 7-1 Speaker Off-hook Call Announce Upgrade (BVSU1A)

3. Slide the BVSU under the tabs.
4. Position the BVSU holes over the standoffs and secure with the two provided screws.

   Screws are provided with the BVSU:

   Four M2.6 screws for DKT2000/2500
   Two M3 screws for the DKT3000/3500
5. Connect the BVSU wire plugs to the two “PCI/VSU” connectors on the PCB inside the phone, with the red wire on the side where “RED” is silk-screened on the DKT PCB (see Figures 7-3 and 7-7, 7-8).

6. Reinstall the telephone base and secure it with its four captive screws.

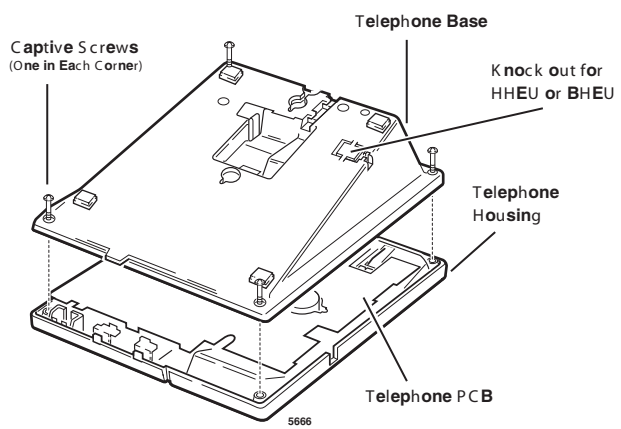


Figure 7-2 Removing Telephone Base

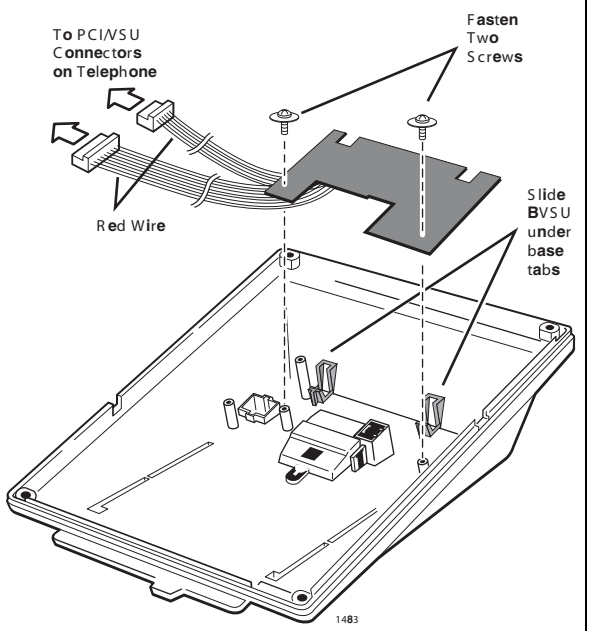


Figure 7-3 BVSU Installation

Telephone Headset (BHEU) Upgrade

The BHEU can be installed into the DKT3000/3500-series telephones to enable headset or external ringer use. For information on connecting the external ringer, refer to "Telephone External Ringer" on Page 8-17. The BHEU can also be installed into DKT3010 and DKT3020 telephones that have either a BVSU or BPCI installed. For DKT3001 and DKT3014 telephones, the installation is same as below, only the connector location is different.

BHEU Installation

1. Loosen the four captive screws on the telephone base, and remove the base. Knock out hole for the BHEU cord (see Figure 7-2).
2. If you are connecting an ECM or Carbon-type headset to the BHEU, leave the BHEU jumper in the "AUTO" position(see Figure 7-4).

   "AUTO" enables the BHEU current detector to determine which headset type is connected (less than 2mA detects EU and more than 2mA detects Carbon). If, in a rare case the current is marginal using a carbon headset (only) and performance is not adequate, set the jumper to "CARBON."
3. Make sure that the SW2 jumper plug is set to "NORMAL."
4. If you do not want the handset receiver to work when the handset is on-hook and a headset (connected to BHEU) is being used, cut the HEU strap on the DKT PCB (see Figures 7-7 and 7-8).
5. Position the BHEU PCB (component side down) on the standoffs inside the base, and secure with the two provided screws (see Figure 7-5).
6. Connect the BHEU integrated wire plug to P3 (HEU) on the telephone base PCB (see Figures 7-6 and 7-9). Note the location of the red wire.

   ...or for DKT3001 telephones only, connect the BHEU wire plug to P1 (HEU) on the telephone base PCB (see Figure 7-9). Note the location of the red wire.
7. Reinstall the base on the telephone.

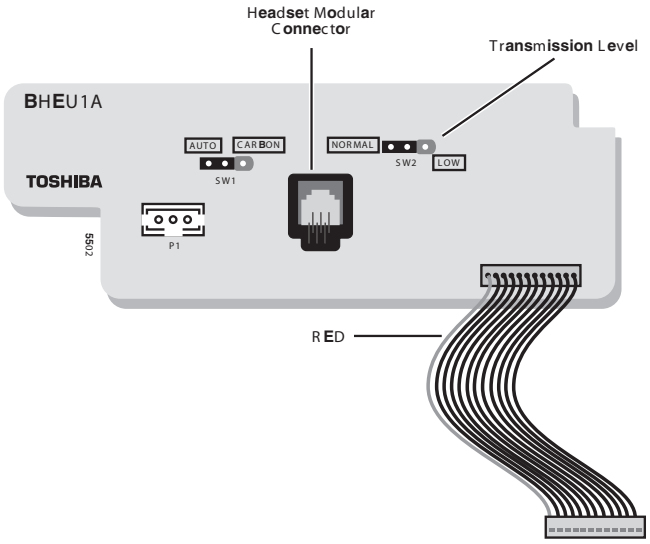


Figure 7-4 BHEU PCB

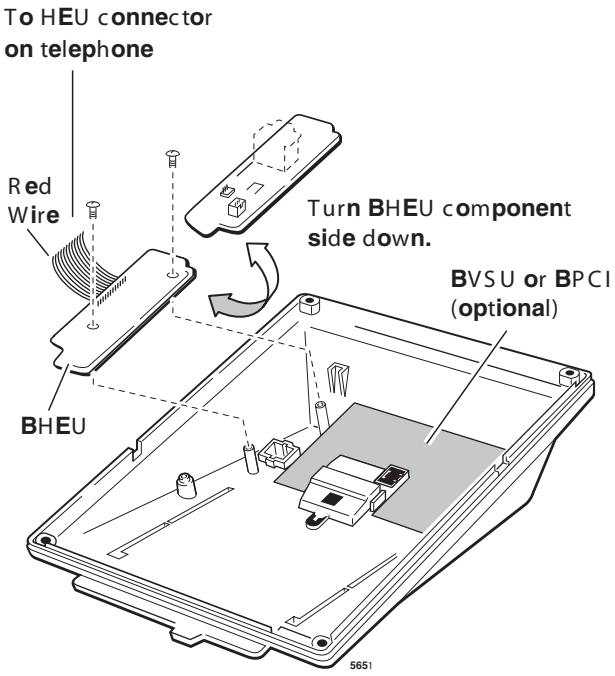


Figure 7-5 BHEU Installation

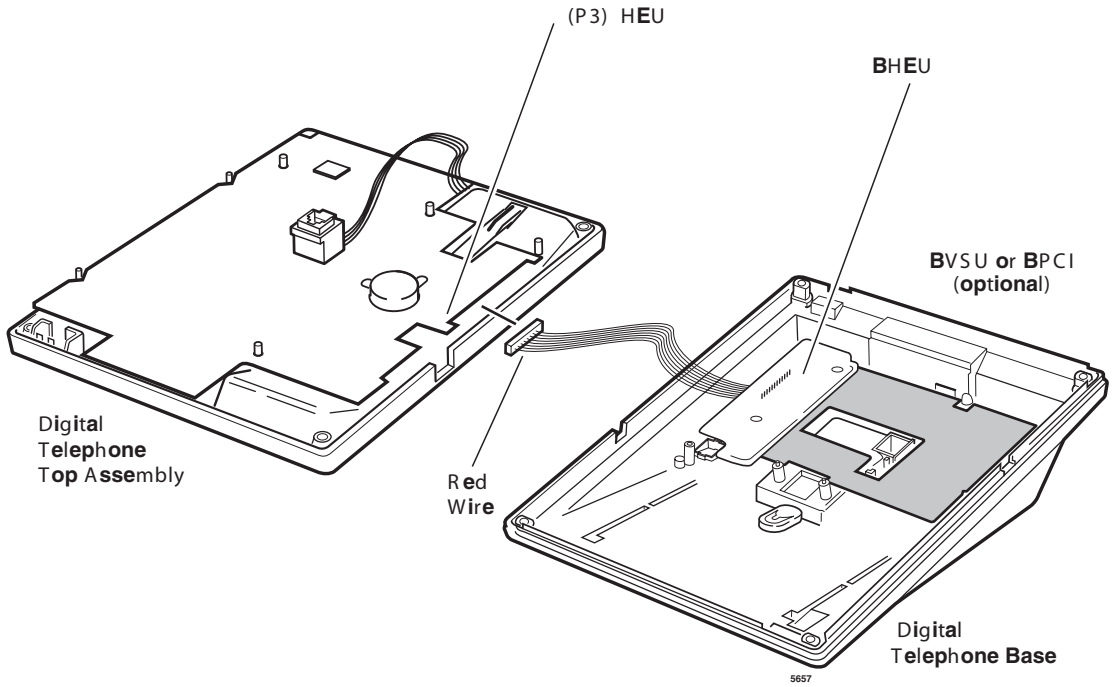


Figure 7-6 BHEU Installation

Telephone Option Straps

Certain option straps on the DKT3000/3500-series phones must be cut when installing carbon handsets, external power or headsets. Refer to Table 7-5 and Figures 7-7~7-9 for further instruction.

Table 7-5 Station Option Interface PCB Compatibility

Name of the Strap on the DKT PCB	DKT3010-S, DKT3020-S, DKT3010-SD, DKT3020-SD DKT3500-series	DKT3014 -SDL	DKT3001	Explanation
Carbon	W301, W302	W301, W302		If a carbon-type handset or carbon-type headset is connected to the *handset* jack, the carbon wire jumper straps, listed on the left, must be cut inside the telephone. When a carbon headset is connected to the BHEU, you do *not* need to cut the straps. See Figures 7-7~7-9.
HEU	W303	W303	W103	To turn off the handset receiver when the handset is on-hook and a headset is used with the BHEU, cut the “HEU” strap shown on the left.
EX.POWER	W101, W102	W101, W102	W101, W102	Cut the “EX.POWER” straps only when external power is connected to the second pair (pins 2 and 5) of the telephone modular jack. See Chapter 6 – MDF PCB Wiring, Figure 6-6 on page 6-9.
SET UP	W401, W402	W401, W402		Do not cut – for factory use only.

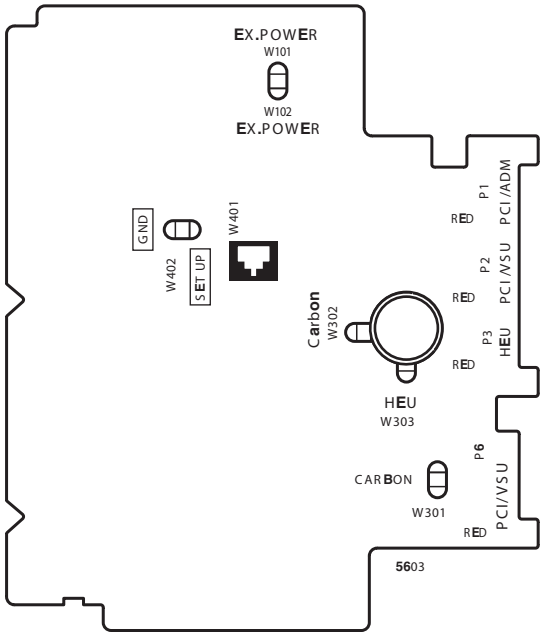


Figure 7-7 DKT3010, DKT3020 Strap and Connector Locations

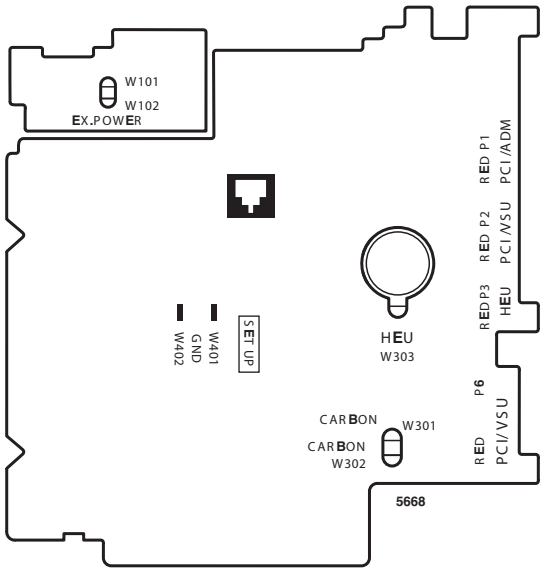


Figure 7-8 DKT3014 Strap and Connector Locations

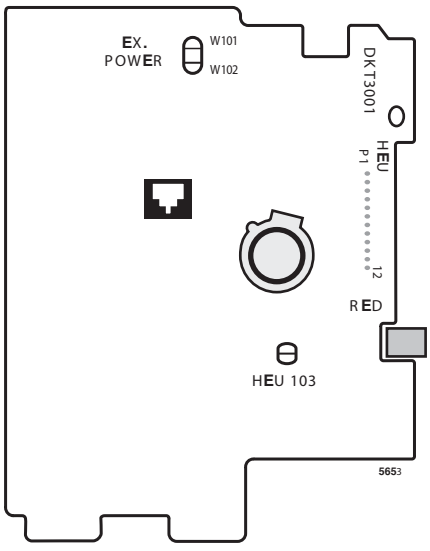


Figure 7-9 DKT3001 BHEU Connector Location

TAPI and Simultaneous Voice and Data Upgrades for 3000/3500-series Telephones (BPCI)

Digital telephones can be upgraded with a Personal Computer Interface (PCI) to provide desktop interface with the telephone and PC USB port. The PC connected to the BPCI can place telephone calls, receive Caller ID, ANI, and DNIS information. The BPCI is compatible with Microsoft TAPI application programs.

BPCI Installation

1. Loosen the four captive screws on the digital telephone base to remove it. Knock out the plastic cover on the telephone base to provide access to the BPCI USB port. See Figure 7-10.
2. Refer to Figure 7-10 and install the BPCI inside the phone base. Secure with screws.
3. Insert the three integrated unit wire plugs into connectors P1, P2 and P6 on the PCB in the telephone. Make sure that the red wire is positioned as shown. (P1-P1, P2-P2, P6-P4.

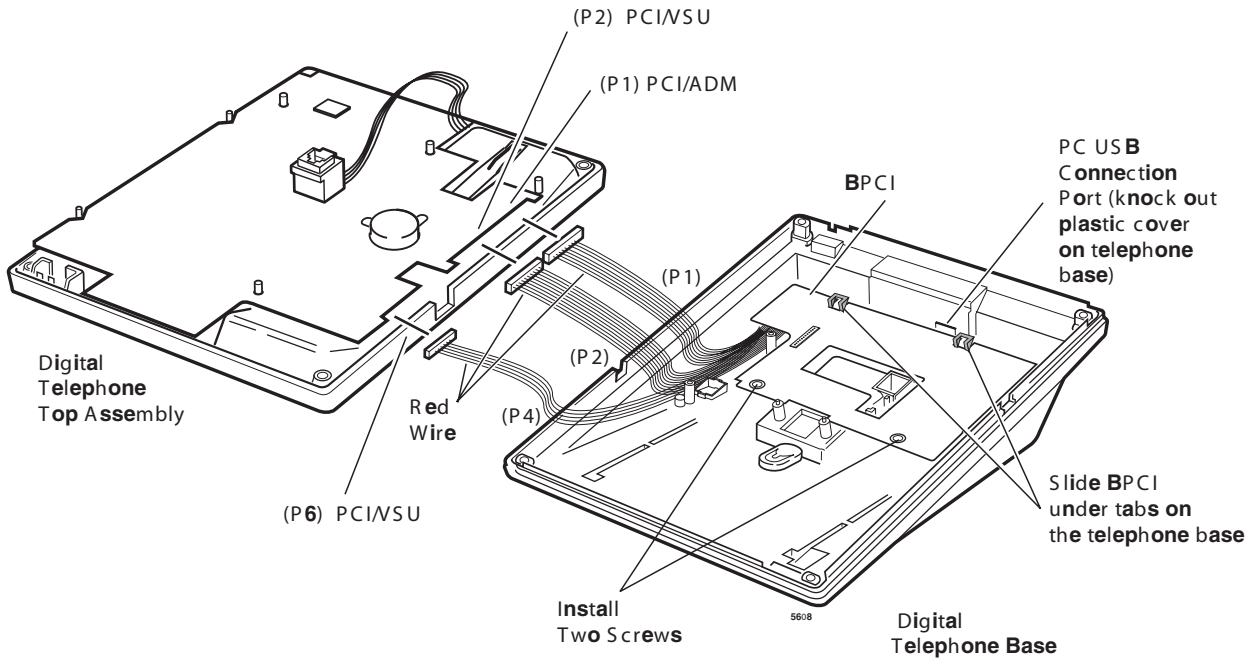


Figure 7-10 BPCI Installation

4. Stick the USB label onto the base, just below the modular cord port (see Figure 7-11).

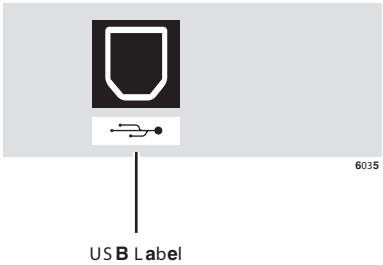


Figure 7-11 USB Label

Important!

- *BPCI requires a DKT3000/3500-series telephone set in the DKT3000/3500 mode (see "DKT2000/2500 Mode On/Off" on Page 7-17).*
- *The BPCI also requires that the DKT3000/3500-series telephone be connected to a BDKU or BDKS PCB set to the "BDKU" mode (not the "PDKU" mode). BPCI will not function on a telephone connected to a PDKU or RDSU PCB.*

3000/3500-series Telephone Settings

The button layout for the 3010- and 3020-series telephones are shown in Figure 7-12. The DKT3014, large LCD telephone has additional buttons for features and programming (see Figure 7-14).

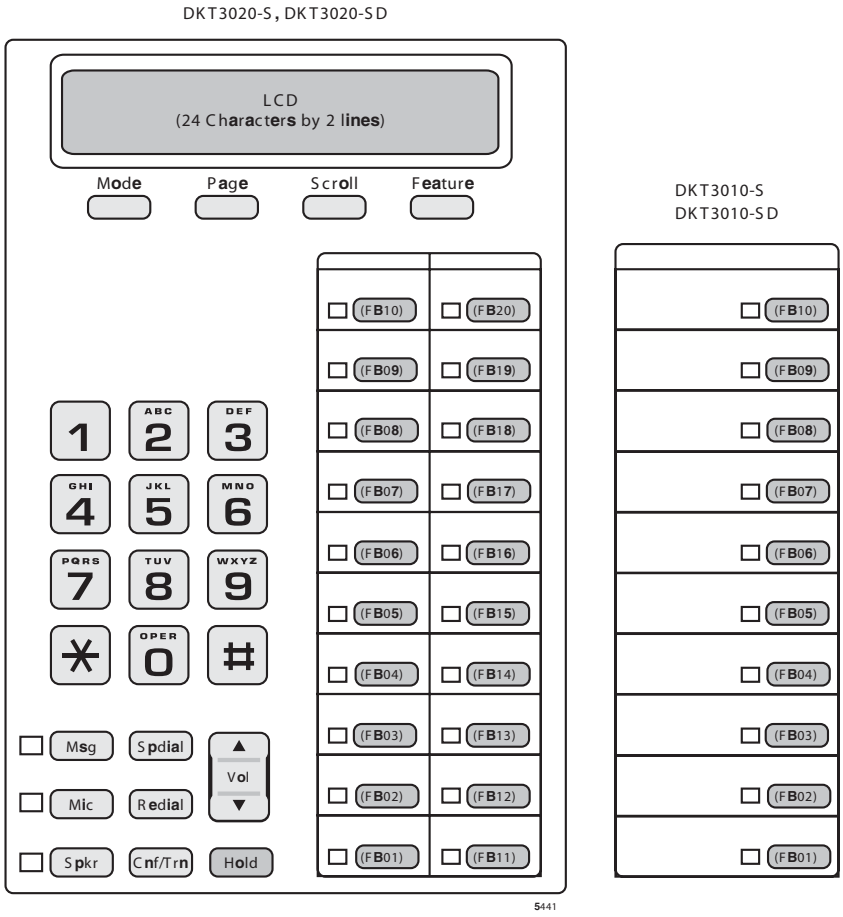


Figure 7-12 DKT3010/3020 Button Telephones

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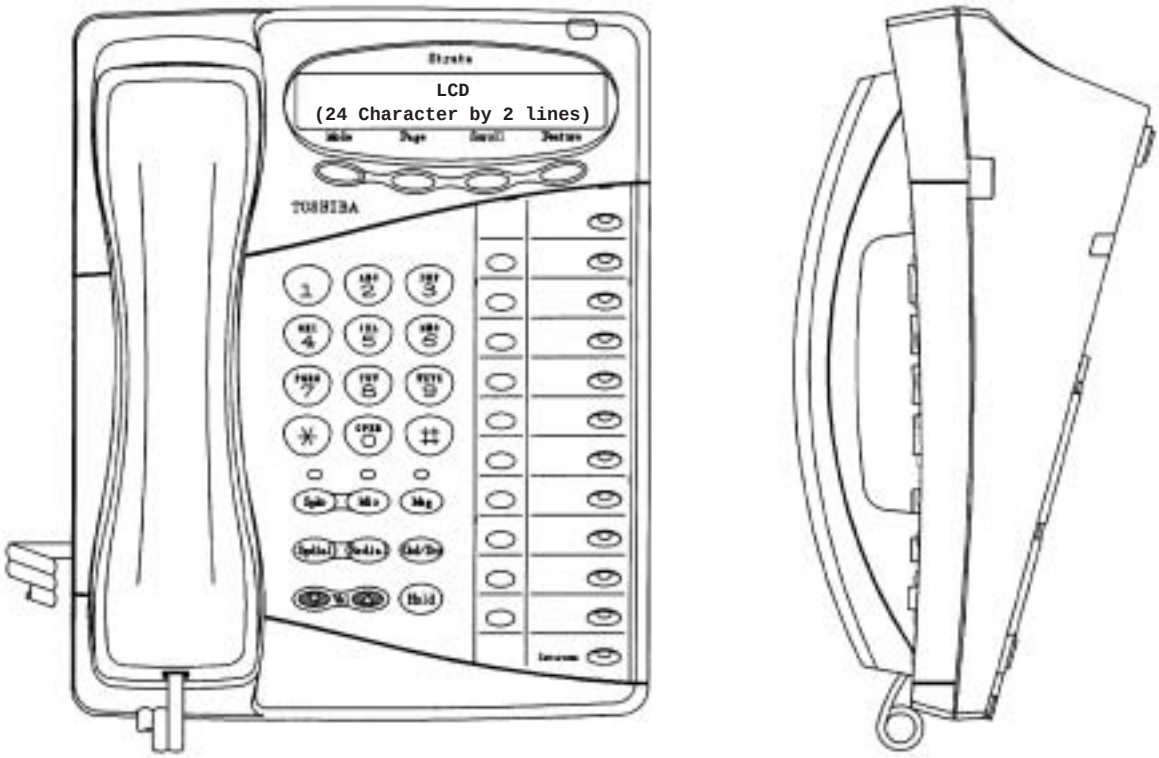


Figure 7-13 DKT3512-SD/DKT3524-SD Button Telephones

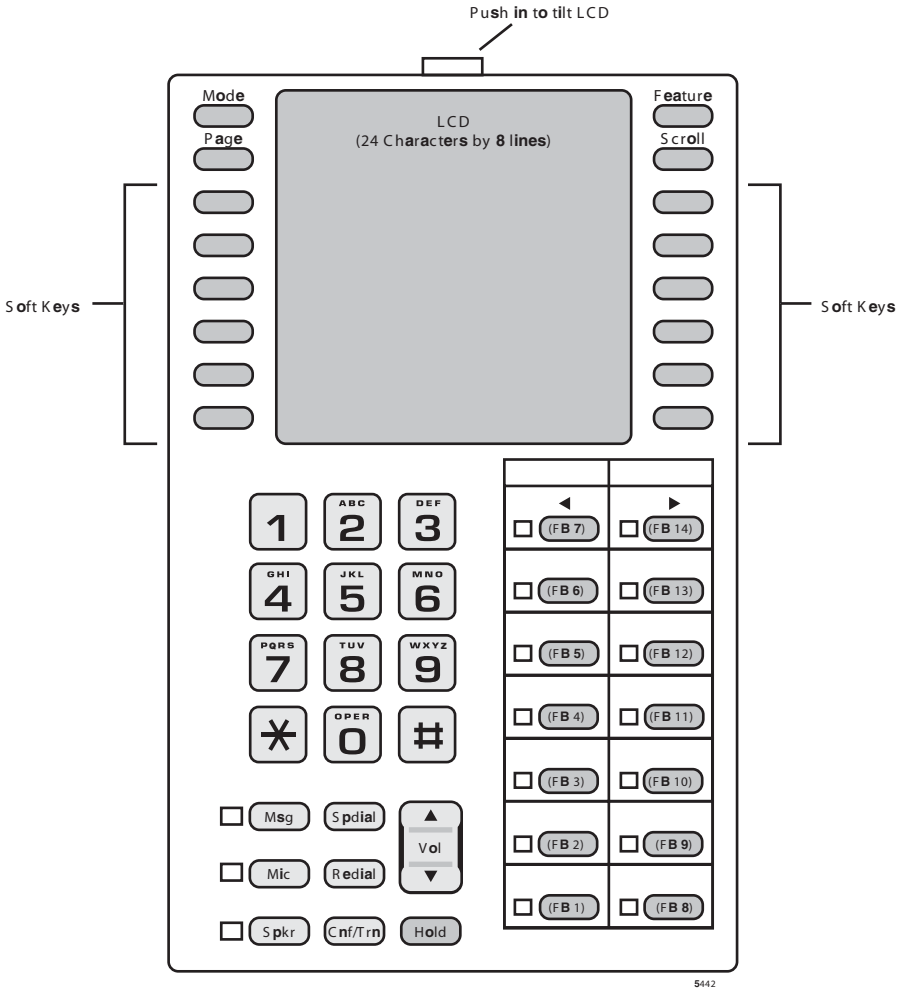


Figure 7-14 DKT3014-SDL Buttons

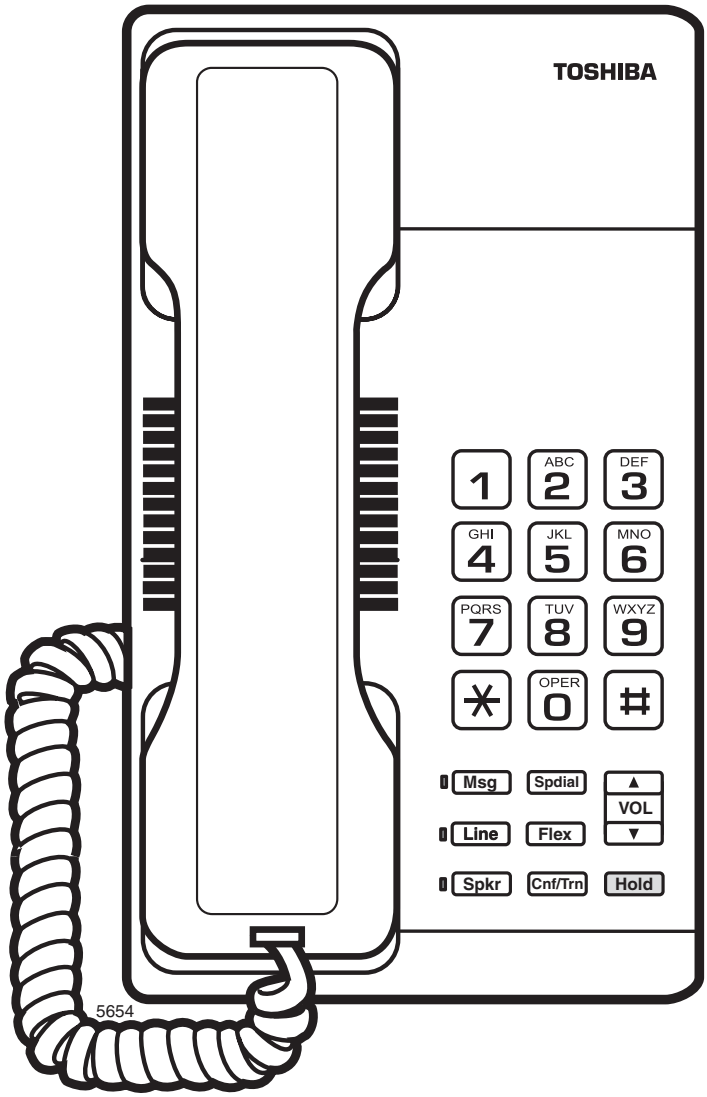


Figure 7-15 DKT3001 Buttons

Telephone Programming Mode A

The 3000/3500-series telephones enable you to set a number of features directly from the phone, including: Call Waiting Tone (On/Off), Flex Key, Msg Key, LCD contrast, Speakerphone/Microphone Room Noise Sensitivity (On/Off), and Country settings. “Telephone Programming Mode A” programs settings on a ROM chip inside the telephone.

Note Some of the procedures use Feature Buttons (FB1, FB2, etc.). When your telephone is in Programming Mode, the flexible buttons are numbered as Feature Buttons, as shown in Figures 7-12 and 7-14.

➤ **To place your telephone in Programming Mode A**

➤ Press **3**+**6**+**9**+**Hold** simultaneously. The LCD displays “DKT PROGRAM MODE” and “SELECT=”. Your phone will not ring if it receives a call while in Programming Mode.

➤ **To exit from Programming Mode A**

➤ Go Off- and On-hook or wait for 30 seconds for Programming Mode to automatically time out.

Telephone Program Option Reset

This function resets all Programming Mode A option settings to their default setting.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **Vol ▲** + **Msg** (**Msg** LED On means reset is set to activate)
3. Press **Hold** to activate reset.
4. Go off-hook, then on-hook to exit the program mode.

Dial Pad and Button Beeps

Digital telephones can emit a “beep” sound whenever a dial pad or feature button is pressed. The “beeps” are On by default. Follow these steps to turn the “beeps” On or Off on 3000/3500-series DKTs.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **0**.
3. Press Feature Button 1 (FB1) to toggle On/Off.

   FB1, LED On: buttons beep.

   FB1, LED Off: buttons do not beep.
4. Press **Hold** to set the option.
5. You must also go off-hook, then on-hook to exit the program mode.

Speakerphone/Microphone Sensitivity Adjustment

When you are using the speakerphone, high ambient noise levels may cause the party you are talking with to be to cut off frequently. If this happens, follow these steps to lower the sensitivity of the microphone on a 3000/3500-series telephone. The default is normal sensitivity.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **0**.
3. Press Feature Button 3 (FB3) to toggle On/Off.

   FB3, LED On: Lower sensitivity

   FB3, LED Off: Normal sensitivity
4. Press **Hold** to set the option.
5. Go off-hook, then on-hook to exit the program mode.

Call Waiting and Camp-on Ring Tone Over Handset/Headset Option

Call Waiting and Camp-on tones are sent to a busy telephone's speaker to indicate that a call is waiting. Call Waiting and Camp-on Tones can be sent, as an option, to the telephone handset or headset, in addition to the speaker. Follow these steps to turn handset/headset Call Waiting and Camp-on tone On/Off for a 3000/3500-series telephone. The default is Off.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **0**.
3. Press Feature Button 4 (FB4) to toggle On/Off.

   FB4, LED On: Call Waiting tone

   FB4, LED On: No Call Waiting tone
4. Press **Hold** to set the option.
5. Go off-hook, then on-hook to exit the program mode.

DKT2000/2500 Mode On/Off

If you have a cordless telephone (DKT2004-CT or DKT2104-CT) that is connected to a 3000/3500-series telephone, you must place your DKT into 2000/2500-mode before connecting the cordless telephone; otherwise, the 3000/3500-series telephone will not work.

In 2000/2500-mode:

- Only 16 characters by two lines display on the LCD.
- LCD Feature button does not work
- Spdial button does not work

Step 1: To turn DKT2000/2500 Mode On/Off

Important! *You must change the mode on DKT3000/3500 telephone before connecting a DKT2004-CT or DKT2104-CT to the DKT3000/3500.*

1. On the DKT3000/3500 telephone, press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **#**.
3. Press **FK7** (or **FK13** on the DKT3014). LED On = 2000/2500 telephone. LED Off = 3000/3500 telephone.
4. Press **Hold**.
5. Lift the handset to exit programming mode. Wait a few seconds for the telephone to reset itself.

Step 2: Connect the cordless telephone to the DKT3000/3500 telephone.

Redial/Feature Button Activation/Deactivation (DKT3001 only)

Your **Flex** button has been set to act as a **Redial** button by default. However, you can reprogram the **Flex** button to work as Flexible Button, as it it set in system programming. These steps enable you to change how the button functions.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **0 7**.
3. Press **Msg** to toggle On/Off

   Msg LED On: **Flex** button works as Feature Button

   Msg LED Off: **Flex** button works as a **Redial** button.
4. Press **Hold** to set the option.
5. Go off-hook, then on-hook to exit the program mode.

Note If you program the **Flex** button to work as Flexible Button 3, you can press ***** to redial.

Msg/Feature Button Activation/Deactivation (DKT3001 only)

Your **Msg** button has been set by default to work as a **Msg** button; however, you can reprogram it to work as Feature Button.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **0 8**.
3. Press **Msg** to toggle On/Off.

   Msg LED On: **Msg** operates as Feature Button

   Msg LED Off: Works as a **Msg** button.
4. Press **Hold** to set the option.
5. Go off-hook, then on-hook to exit the program mode.

Test the Display on Large LCD Telephones (DKT3014-SDL only)

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **Page**.
3. Press **1**. LCD screen is blank.
4. Press **2**. Each segment shows three vertical lines, in all eight rows.
5. Press **3**. Each segment contains five short horizontal lines, in all eight rows.
6. Press **4**. Each segment contains a pattern of small dots, in all eight rows.
7. Press **5**. All of the available characters, including numbers, display.
8. Go off-hook, then on-hook to exit the program mode.

Reset and Adjust the LCD Contrast

Step 1: Adjust LCD Contrast for the LCD Telephones

1. Press and hold down the **Mic** button, and press and release **Vol** ▲ or **Vol** ▼ repeatedly.

   Each time you press **Vol** ▲ or **Vol** ▼ , the contrast increases or decreases. There are eight steps in either direction. To return to the middle setting, repeat "Step 1" above.
2. Press **Hold** to reset the LCD contrast.
3. Go off-hook, then on-hook to exit the program mode.

Step 2: Reset LCD Contrast for the DKT3014-SDL

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press **Mode**.
3. Press **Msg** so that the **Msg** LED is On.
4. Press **Hold**. This sets the LCD lightness/darkness contrast on the middle setting.
5. Go off-hook, then on-hook to exit the program mode.

Country Settings On/Off

This procedure enables you to change the country settings for telephone CODEC operation in various countries, see Table 7-6.

Notes

- In CTX100/670, country setting is set by centre programming.
- In old systems, country setting by each terminal is requested.

1. Press **3**+**6**+**9**+**Hold** (simultaneously).
2. Press *****.
3. Press Feature Buttons 1~4 (FB1~FB4) On/Off according to the Table below

   ...or, for the DKT3001, pressing **1**~**4** and toggle the **Msg** LED On/Off (see following)

   press **1** (**Msg** LED Off means that FB1 is Off)

   press **2** (**Msg** LED Off means that FB2 is Off)

press **3** (**Msg** LED Off means that FB3 is Off)

press **4** (**Msg** LED Off means that FB4 is Off)

4. Press **Hold** to set the option.
5. Go off-hook, then on-hook to exit the program mode.

Note On the DKT3001, the Msg LED shows if the feature has been turned On/Off. There is no visible indication on the other telephones. If the telephone ringer and busy tone buzzes or doesn't sound clear, check the country settings.

Table 7-6 Country Code Settings for Mu Law/A Law

Country	FB1	FB2	FB3	FB4
USA, Canada (default is Mu Law)	Off	Off	Off	Off
Mexico	Off	Off	Off	On
Taiwan	On	Off	Off	Off
Hong Kong, Thailand	Off	On	Off	Off
Singapore, Malaysia, Indonesia, Sri Lanka, India, China	On	On	Off	On
UK, Ireland	Off	Off	On	On
Australia	On	Off	Off	On

Digital Add-on Module Installation

The DADM provides 20 buttons that can be flexibly programmed for any telephone feature that is provided by the Strata CTX system.

Install one or two DADM to a Toshiba digital telephone (only) (shown below). The digital telephone and the DADM must belong to the same series, i.e., 3000/3500- or 2000/2500-series

- See the appropriate system Installation Chapter for loop length and secondary protection requirements.
- DADMs cannot be installed on telephones that have BPCI, BVSU or DVSU installed.
- Only 1 ADM can be fitted to DKT3500-series.

➤ **To install DADMs**

See Figure 7-16 and follow these steps:

1. Loosen the four captive screws on the digital telephone base and remove it.
2. Remove the base handset hanger.
3. Loosen two captive screws on DADM and remove bases.
4. Put the DADM supplied cable through the telephone and DADM bases.
5. Connect DADM cable connectors to P1 of DADM and P1 of DKT telephone.
6. Install base of DADM and telephone – tuck DADM cable into DADM and telephone base, as necessary, for proper length.
7. Secure DADM to telephone base with DADM connecting plate (using four screws).

8. If required to achieve maximum distance, install two-pair house cable (or external power) and two-pair modular cord, supplied with DADM. (See Chapter 6 – MDF PCB Wiring.)
9. If a second DADM should be installed, connect P1 of the second DADM to P2 of the first DADM with the DADM connecting cable.

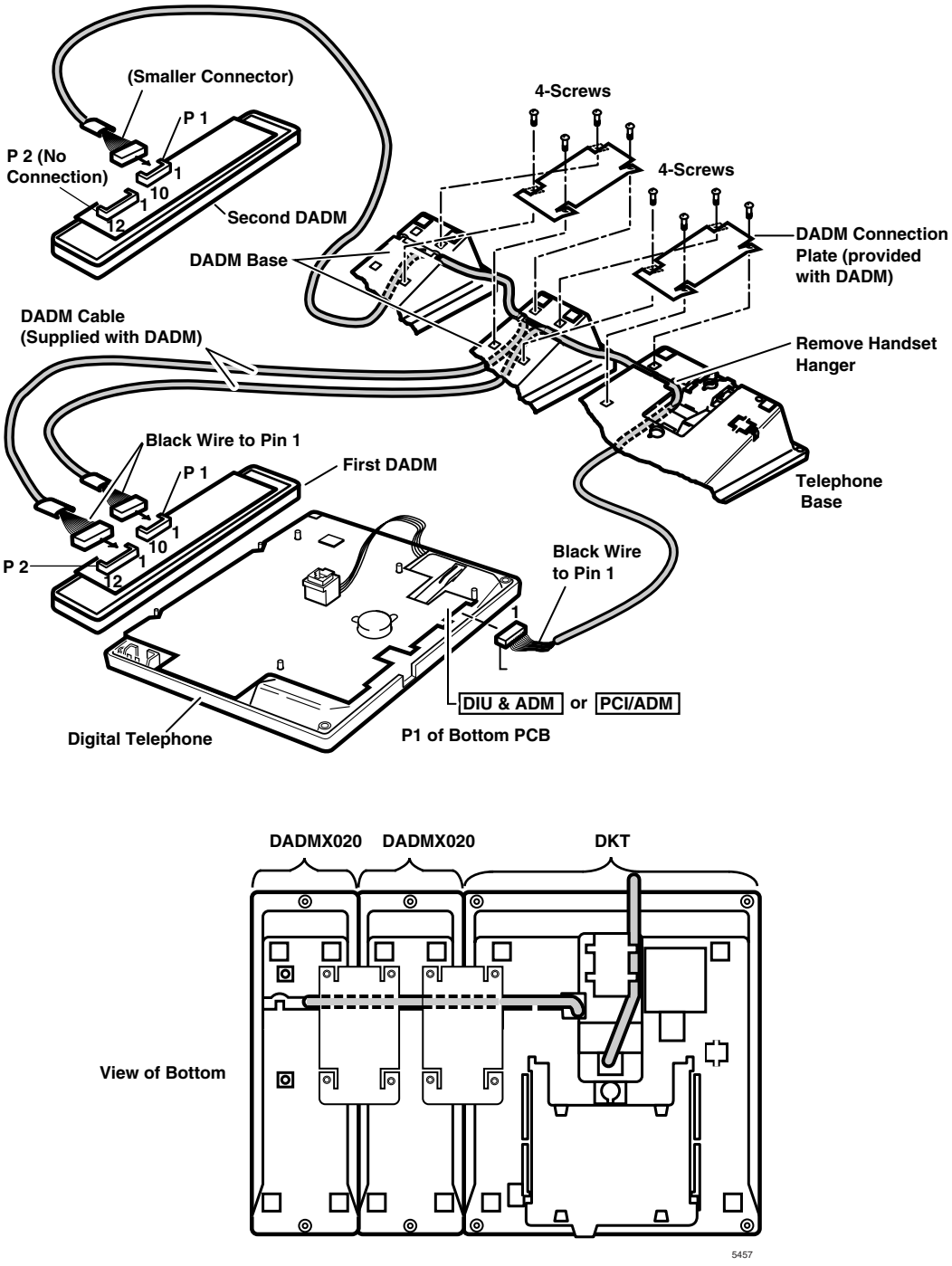


Figure 7-16 Digital Add-On-Module

Tilt Stands and Wall Mounting

This section explains how to attach desktop tilt stands to 3000/3500-series or 2000/2500-series digital DKTs or to a DSS console. Use Tilt Stand model “BTSD” (not BTSA) with a standalone DKT or DSS.

➤ **To attach a Tilt Stand to a 3000/3500-series DKT or DSS**

1. Plug the phone jack into the bottom of the phone or DSS console.
2. Slide the Address Tray out, then gently squeeze the tray and remove it (see Figure 7-17).
3. Pull the top of the Tilt Stand so that it’s open at an angle.
4. Slide the Tilt Stand into the former Address Tray holder. (The Stand should catch under the front tray holder notches.) Push Stand in until it snaps into place (see Figures 7-18 and 7-19).
5. Push in the Lock Release to adjust the tilt angle (0, 10, 20 or 30 degrees, see Figure 7-20).
6. Insert the Address Tray back into its holder.

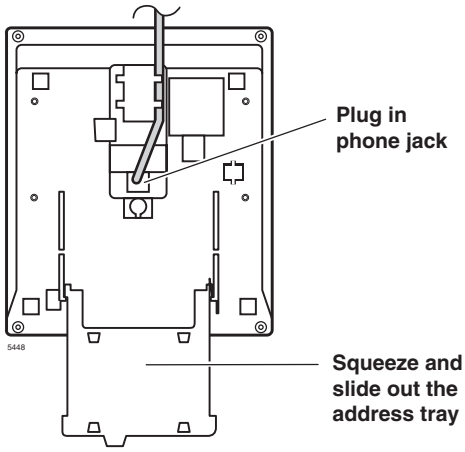


Figure 7-17 Bottom View of Digital Telephone

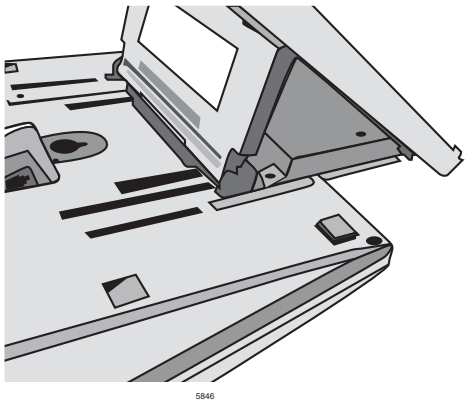


Figure 7-18 Slide Tilt Stand into Address Tray Slot

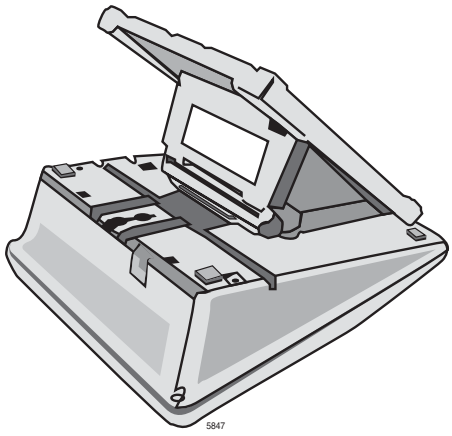
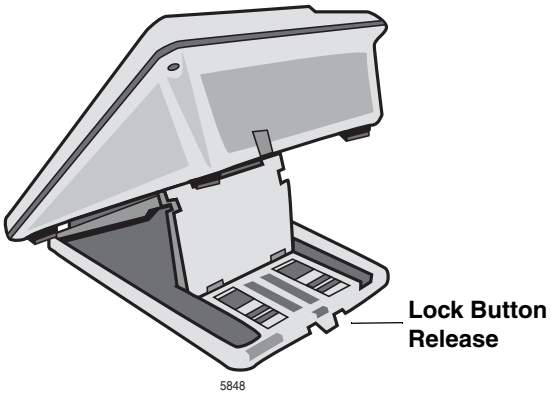


Figure 7-19 Tilt Stand “Snaps” In



Notice:
If you change the DKT tilt stand angle, hold the DKT in your hand when you push the release button so the unit does not fall onto the stand.

Figure 7-20 Telephone on a Tilt Stand

Tilt Stand Installation with Add-on Modules

This section explains how to attaching a tilt stand to a digital telephone with one or two ADMs. Follow the instructions for the appropriate number of ADMs. Use Tilt Stand models “BTSA” (not “BTSD”) for DKTs with one or two ADMs.

➤ **To attach a digital telephone with one ADM to a Tilt Stand**

1. Complete the steps under “To install DADMs” on Page 7-20.
2. Make sure bottom phone jack is plugged in.
3. Remove Tilt Stand from Tilt Stand Base (see Figure 7-22).
4. Place the spacers on the outer holes, as shown (see Figure 7-23).
5. Attach Tilt Stand to bottom of DKT with screws (see Figure 7-21).
6. Reinstall the Tilt Stand Base: Fit the Tilt Stand Base over the Tilt Stand so that the “bottom pegs” fit into the holder. Adjust Tilt Stand so that the “top pegs” fit into the top Tilt Stand Base holes (see Figure 7-22). Do this to both stands.
7. Pull up on the Tilt Stand Bases so that they open to the maximum angle (30 degrees).
8. Push in the Release button to adjust the tilt angle (0, 10, 20 or 30 degrees) of each Tilt Stand.

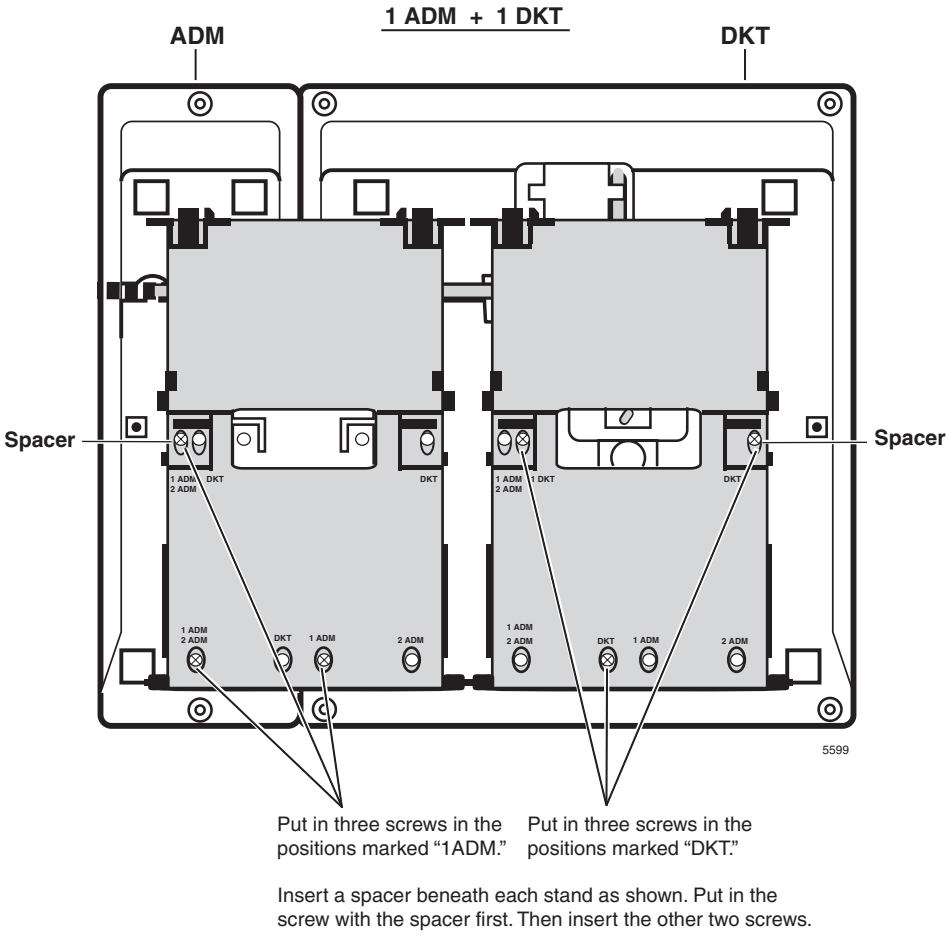


Figure 7-21 Attach Tilt Stands to DKT and One ADM

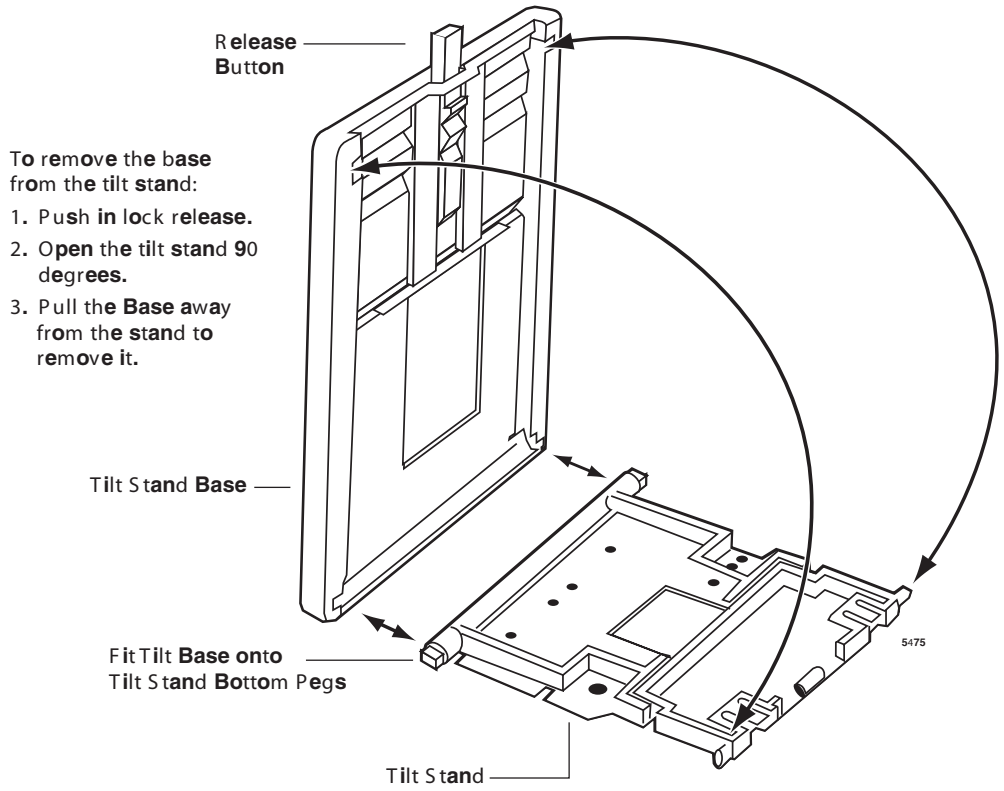


Figure 7-22 Release Adjustment Button

Tilt Stand for DKT + 2 ADMs

Use Tilt Stand models “BTSA” for DKTs with one or two ADMs.

➤ **To attach a digital telephone with two ADMs to a Tilt Stand**

1. Complete the steps under “To install DADMs” on Page 7-20.
2. Make sure bottom phone jack is plugged in.
3. Remove Tilt Stand from Tilt Stand Base (see Figure 7-22).
4. Place the spacers on the outer holes, as shown (see Figure 7-23).
5. Attach Tilt Stand to bottom of DKT with screws.
6. Reinstall the Tilt Stand Base: Fit the Tilt Stand Base over the Tilt Stand so that the “bottom pegs” fit into the holder. Adjust Tilt Stand so that the “top pegs” fit into the top Tilt Stand Base holes. Do this to both stands.
7. Pull up on the Tilt Stand Bases so that they open to the maximum angle (30 degrees). See Figure 7-24.
8. Push in the Lock Release button to adjust the tilt angle (0, 10, 20 or 30 degrees) of each Tilt Stand.

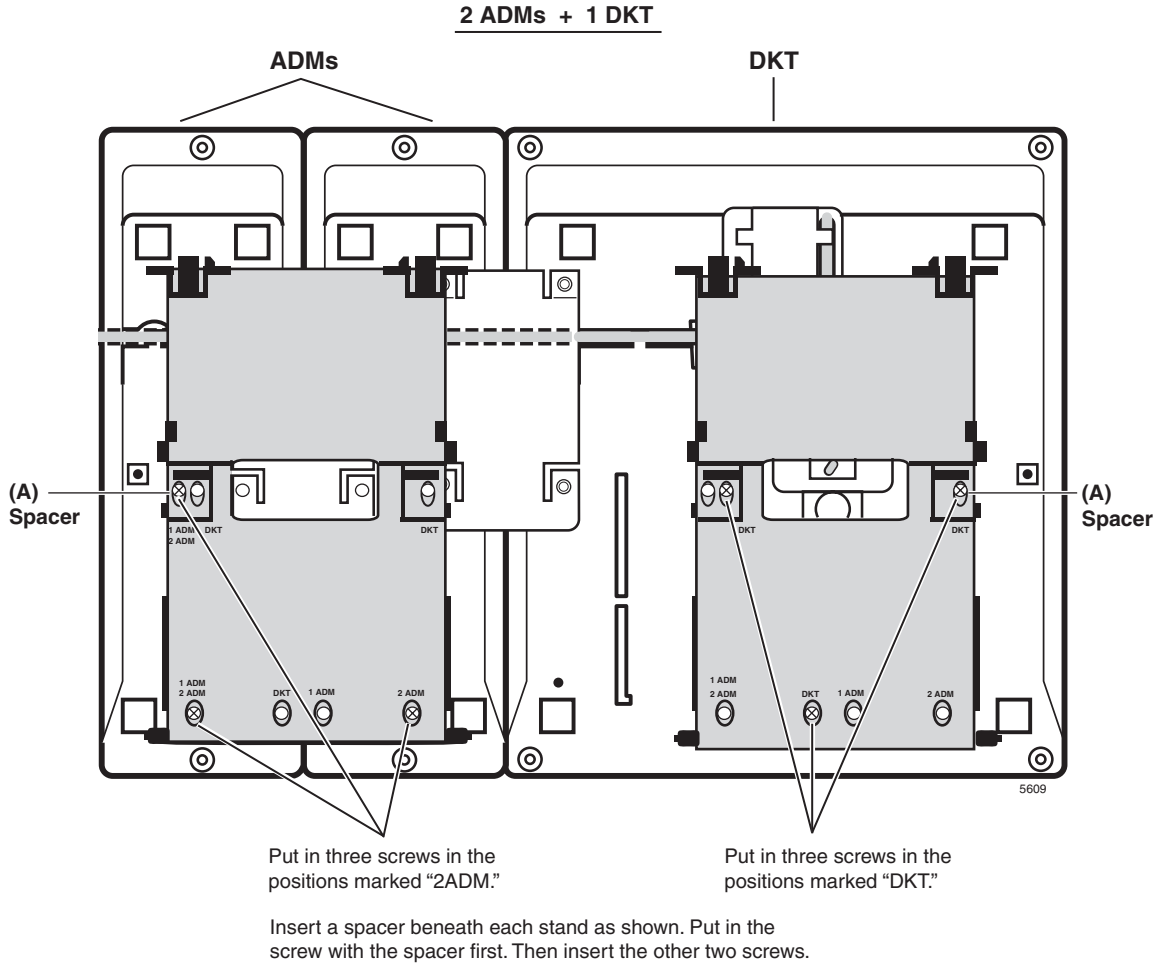


Figure 7-23 Attach Tilt Stands to DKT with Two ADMs

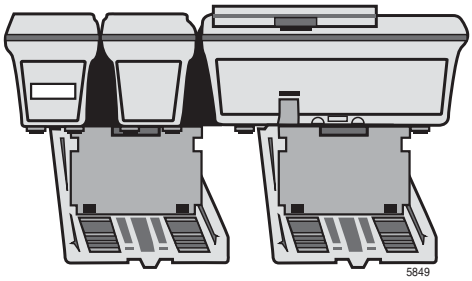


Figure 7-24 Tilt Stands in Raised Position for DKT and Two ADMs

Telephone Wall Mounting

This section explains how to mount digital telephones to a wall. See the manufacturer's documentation for instructions on mounting standard phones.

Notes

- *Digital telephones equipped with BPCIs or PDIU-DI2s cannot be wall mounted.*
- *DKT3014-SDL equipped with a BHEU cannot be wall-mounted.*
- *2000/2500-series digital telephones with headsets can only be wall mounted with an HHEU2.*

➤ **To mount digital telephones**

Refer to Figures 7-25~7-27 and the following steps.

1. Loosen the captive screws, and remove the telephone base.
2. Using a suitable cutter, remove the handset hanger from the base.
3. Insert the handset hanger in the slot on the front of the phone. The hanger fits in the notch on the handset cradle.
4. Rotate the telephone base 180 degrees and secure it to the telephone with its four captive screws.

Note Tilt up the LCD of the DKT3014-SDL before fixing the base.2000/2500-series telephone option

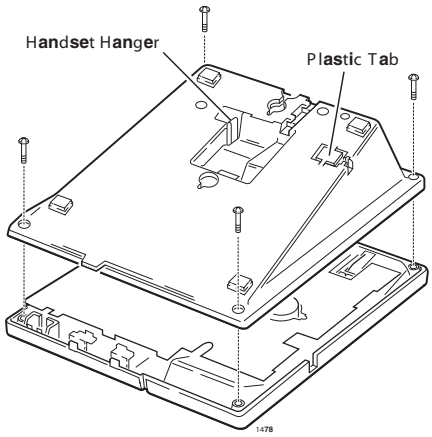


Figure 7-25 Removing the Telephone Base

5. Connect the phone to the wall modular connector with a cord approximately four inches long (available at most telephone supply companies).
6. Route the cord into the hollow portion of the base.
7. Mount the phone on the wall mounting modular connector plate.

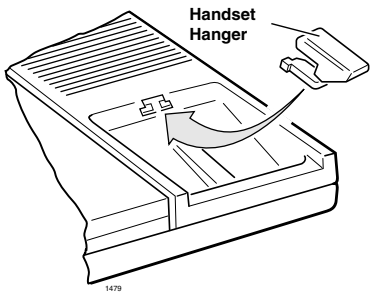


Figure 7-27 Handset

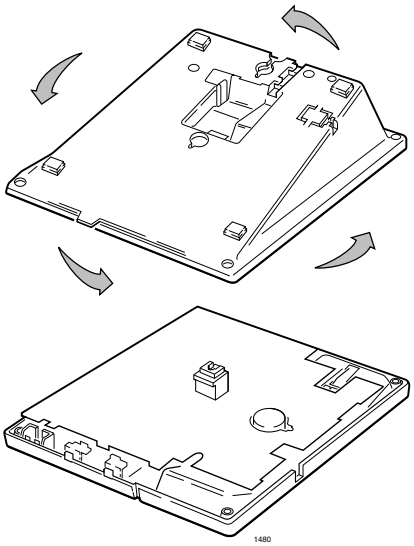


Figure 7-26 Wall Mounting Base Rotation

➤ To wall mount DKT3001 or DKT2001 digital SLTs

1. Loosen the screws, and remove the telephone base.
2. Using a suitable cutter, remove the handset hanger from the base.
3. Insert the handset hanger in the slot on the front of the phone. The hanger fits in the notch on the handset cradle.
4. Rotate the telephone base 180 degrees and secure it to the telephone with its four screws.
5. Connect the phone to the wall modular connector with a cord approximately four inches long (available at most telephone supply companies).
6. Route the cord into the hollow portion of the base.
7. Mount the phone on the wall mounting modular connector plate.

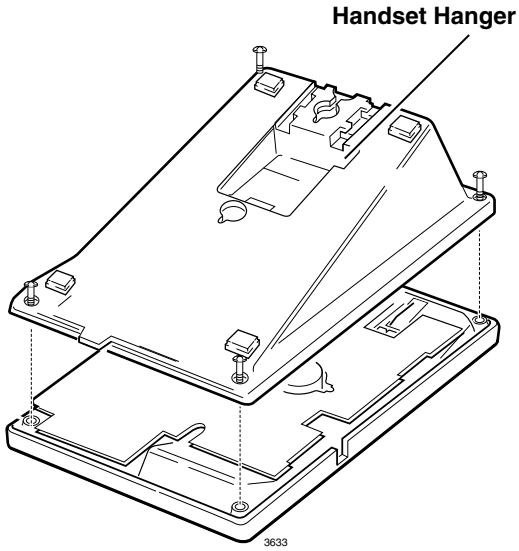


Figure 7-28 Removing the Telephone Base

For instructions for installing and programming the DKT2001, see “Digital Single Line Telephone (DKT2001 only)” on Page 7-48.

Direct Station Selection (DSS) Console/System Connection

The DSS console can be connected to a BDKU/BKDS or PDKU on any circuit. DSS consoles are associated with digital telephones via system programming. This section provides instructions on how to install the consoles.

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DSS Console Connections

DSS consoles are connected to BDKU/BDKS or PDKU PCBs using standard twisted single-pair or two-pair jacketed telephone cable (maximum 1000 feet, 303 meters) is used for the connection.

To accommodate the DSS console connection, the instrument end of the cable should be terminated in a modular station connector block (RJ11). Refer to Chapter 6 – MDF PCB Wiring for wiring/interconnecting details.

Notes

- *DSS console cable runs must not have cable splits (single or double), cable bridges (of any length) or high resistance or faulty cable splices.*
- *See the appropriate Installation chapter for secondary protection information and loop limits.*

CAUTION! When installing the DDSS cable, do not run the cables parallel if they are within three feet of an AC power line. AC power lines should be crossed at right (90◦) angles only. In particular, avoid running station wire pairs near devices that generate electrical noise, such as neon or fluorescent light fixtures.

Standard Telephones

This section explains how to connect standard telephones to the Strata CTX670 system. Toshiba does not provide standard telephones. Whenever standard telephones are mentioned in this manual, it refers to 500- and 2500-type standard telephones.

Note Before proceeding, see warning and caution notes in "Telephone Installation" on Page 7-3.

Standard telephones connect to circuits on the Standard Telephone Interface PCBs: RSTU, RSTU2, RDSU/RSTS and PSTU via the MDF with standard twisted-pair jacketed telephone cable. (See single-pair wiring in Chapter 6 – MDF PCB Wiring for more details.)

The standard telephone cable's overall loop resistance, connected on- or off-premises, is 300 ohms max. for PSTU; 600 ohms for RSTU and RDSU/RSTS with -24VDC (*no* R48S), and 1200 ohms for RSTU and RDSU/RSTS with -48VDC (R48S installed on RSTU, RSTU2, or RDSU PCB), including telephone resistance. This applies to all devices connected to standard telephone circuits.

A standard telephone connected off-premises via the telephone network should interface with OL13A, OL13B, or OL13C lines (or equivalent) and connect to an RJ21X, FIC jack or equivalent.

Cordless Digital Telephones

Note Not available in the UK & Europe.

Toshiba offers two cordless digital telephone models, the DKT2104-CT and the DKT2004-CT. The compact designs of these cordless digital telephones bring mobility and productivity to office telephones.

Both the DKT2104-CT and DKT2004-CT feature digital 900 MHz technology and represent state-of-the-art design and engineering.

The DKT2104-CT and DKT2004-CT telephones can be attached to a Toshiba DKT3000/3500- or 2000/2500-series corded digital telephone or used as a stand-alone. The cordless telephones can operate from the same digital station port on the BDKU or PDKU2 as the digital telephone, which may or may not be attached. They cannot receive Group Pages or All Call Pages.

DKT2004-CT

The DKT2004-CT can be attached to a Toshiba DKT3000/3500- or 2000/2500-series corded digital telephone or is used as a stand-alone. It provides many sophisticated Strata features, including:

- 900 MHz Digital Spread Spectrum technology
- LCD provides information such as User Name, DNIS and Caller ID
- Four programmable buttons for feature, multiple line or feature access
- Headset jack (headset optional)
- Handset volume adjustment

- Conference/Transfer (**Cnf/Trn**) button
- Message Waiting LED
- **Hold** button
- 20 Speed Dial number memory (in addition to 40 station speed dials)

Precautions

Before you read anything else, please observe the following:

WARNING! **Toshiba *does not* represent this unit to be waterproof. To reduce the risk of fire, electrical shock, or damage to the unit, *do not* expose this unit to rain or moisture.**

WARNING! **Regarding DKT2004-CT Rechargeable Nickel Metal Hydride Battery:**

- **The Rechargeable Nickel Metal Hydride contained in this equipment may explode if disposed of in a fire.**
- **Do not short circuit the battery.**
- **Do not charge the Rechargeable Nickel Metal Hydride used in this equipment in any charger other than the one designed to charge this battery as specified in this Guide. Using another charger may damage the battery, or cause the battery to explode.**

Rechargeable Nickel Metal Hydride Batteries Must Be Recycled or Disposed of Properly

- Residents of Minnesota should contact 1-800-225-PRBA for information concerning reclamation and disposal of Rechargeable Metal Hydride batteries.
- Residents outside of Minnesota should contact their local authorities for information concerning reclamation and disposal of Rechargeable Metal Hydride batteries.:

WARNING! **To reduce risk of fire, use only Model EXP9590 batteries.**

CAUTION! **To power your Toshiba DKT2004-CT Cordless base unit, use only UL Listed AC Adapter Model AD-9590 Class 2 Power Supply.**
Ratings are:
Input:120VAC 14W
Output:10VDC 500mA

Important! *Charge your battery for 10 hours before using your new Cordless Digital Telephone.*

DKT2104-CT

The DKT2104-CT works with Strata CTX telephone systems and provides you with reliability, long life, and outstanding performance. Some of its features are:

- 900 MHz Digital Narrow Band technology
- 30 Simultaneous channels
- LCD that wraps using 2 lines, total of 32 characters
- Four displayed operation modes, including Message Waiting (MW)
- Hold, MSG (LCD icon), Cnf/Trn, and Mute buttons
- Headset jack (headset optional)
- Five handset ring modes, including a vibration mode
- Simultaneous charging of handset and spare batteries
- Wall-mount or desktop unit with wall-mount plate, and belt clip included.

Cordless Telephone Installation (DKT2004-CT and DKT2104-CT)

Important! *Your telephone system must be programmed for Auto Preference for your TALK button to work. If there is a shared digital telephone, you receive internal system dial tone automatically after picking up the handset of your deskset. For example, in a Strata CTX system, Program 32 must have a setting other than "00." It is best to set Auto Line Preference to access Intercom dial tone.*

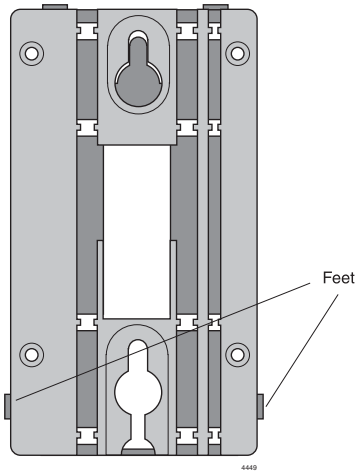
➤ **To install the cordless telephone**

1. Select a location for your cordless digital telephone. Avoid excessive heat or humidity. For wall mounting, refer to the following section.
2. Place the cordless digital telephone's base unit on a desk or tabletop near a standard 120VAC outlet and within reach of the digital telephone line connection to your Strata CTX system.
3. Keep the base unit and handset away from sources of electrical noise (motors, fluorescent lighting, etc.).

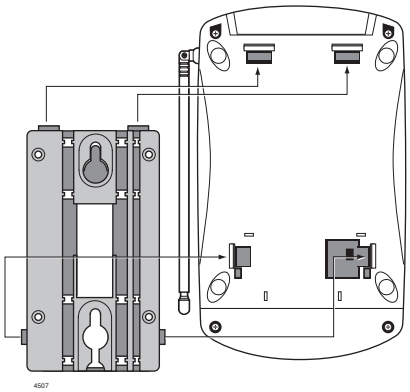
Important! *Place the cordless telephone to the right of the DKT. If placed on the left of the DKT, the cordless antenna will pick up a tone due to its close proximity to the DKT speaker and electronic parts.*

➤ **To mount on a wall**

1. Select a wall location near a 120VAC outlet and within reach of the Strata CTX digital line connection.
2. Place the wall plate (shown at right) against the wall, and with a pencil, mark the position of the screws.With a punch tool, punch “starter” holes in the wall.
3. Align the wall plate and screws on the wall where the “starter” holes are and tighten down the screws.



4. Ensure that the wall-mount plate is placed on the wall so that the “feet” are at the bottom when you are looking at the inside of the plate.
5. Snap the Base Unit onto the plate.



Telephone Cord Connection

There are two telephone line jacks on the back of the base unit of your cordless digital telephone: “Line In” and “Line Out.” You can connect the cordless digital telephone to both the telephone line and a Strata CTX digital telephone.

➤ **To connect cords for use as a stand-alone telephone**

➤ Connect the modular jack labelled “Line In” to the telephone wall jack.

...or

➤ **To connect cords for use with a desk telephone**

1. Unplug the telephone line cord from your desk telephone.
2. Connect this cord to “Line In” of your cordless telephone.
3. Using the two foot modular cord that came with your cordless telephone, connect the jack labelled “Line Out” to the desk telephone.

Connect and Apply Power to Base Unit

The AC adapter furnished with this telephone may be equipped with a polarized line plug (a plug having one blade wider than the other). This plug fits into the power outlet only one way. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still does not fit, contact your facilities coordinator about replacing the obsolete plug. Do not alter the shape of the blades on the polarised plug.

➤ **To connect the cordless telephone using the AC adapter**

1. Plug the AC adapter cord into the AC adapter input jack on the base unit (see Figure 7-29).

CAUTION! Use only the AC adapter supplied with your cordless digital telephone.

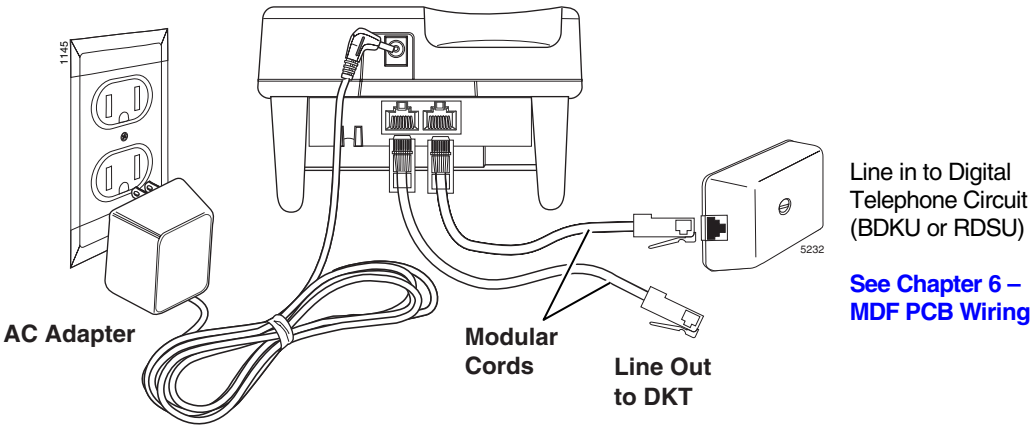


Figure 7-29 Cordless Telephone AC Adapter

Cordless Telephone Connectors

2. Plug the AC adapter into a standard 120VAC wall outlet.
3. Route the power cord where it is not a trip hazard, and where it will not become chafed and create a fire or electrical hazard.
4. Wrap the power cord around the notch on the bottom of the base unit (see Figure 7-30).
5. Check to see that the power LED is on, indicating the telephone has power.
6. Before using your cordless digital telephone, be sure to raise the antenna to the vertical position.

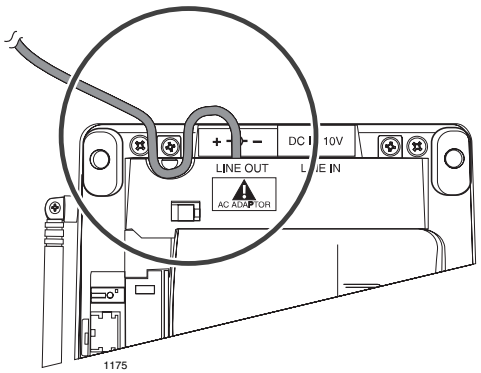


Figure 7-30 Line Out Cord

Important! *If the cordless telephone is connected to a DKT3000/3500-series telephone, be sure to program the DKT3000/3500 telephone to act as a DKT2000/2500; otherwise, the LCD readouts will not fit on the cordless telephone LCD. See "DKT2000/2500 Mode On/Off" on Page 7-17 for instructions.*

Attach/Remove Belt Clip to Handset (optional)

➤ **To attach the belt clip to the handset**

1. Snap the tabs of the belt clip into the notches on the sides of the handset.
2. Use the belt clip to attach the handset to your belt or pocket for convenient portability.

➤ **To remove the belt clip**

1. Pry one tab at a time from the notch on the side of the handset.
2. Carefully lift the belt clip off.

The belt clip is designed to fit snugly onto the handset.

Handset Battery Pack Installation

1. Place a charged battery pack onto the handset so that it slides easily along the ridges.

   If your battery is not charged, see "Removing and Charging Your Battery Pack" on Page 7-34.
2. Slide the battery pack up onto the handset until it clicks into place.

You are now ready to configure your cordless digital telephone.

Removing and Charging Your Battery Pack

Before using your new cordless digital telephone, the battery must be charged continuously for six to eight hours.

➤ **To remove the handset's battery pack**

1. Press in on the battery pack release latch.
2. Slide the battery pack off the handset.

Note You may have to pull hard to slide the battery pack off when the handset is new.

➤ **To charge the DKT2001-CT handset's battery pack**

1. Place the handset on the base unit.
2. Make sure the CHARGE LED lights. If it does not light, check to see that the AC adapter is plugged in and that the handset is making good contact with the base unit.

➤ **To charge extra battery packs**

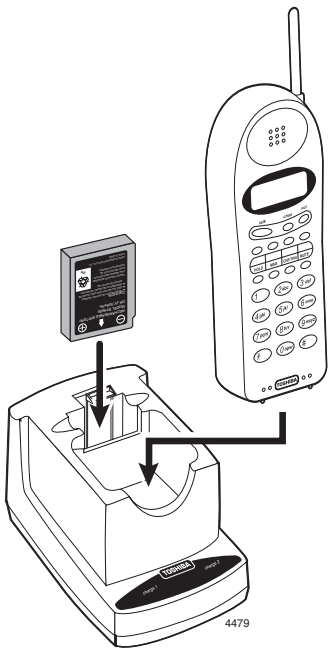
1. Position the battery pack so the inner side is facing toward the top of the base unit.
2. Slide the battery pack into the charging compartment until it clicks into place.
3. Make sure the BATTERY CHARGE LED lights. If it does not light, make sure the AC adapter is plugged in and that the battery pack is seated into the charger.

Note Charge the standard 400 mAh battery pack without interruption for six to eight hours. Charge the optional 730 mAh extended battery pack without interruption for eight to 10 hours.

➤ **To charge the DKT2104-CT handset's battery pack**

Important! *Before using your handset, the battery must be continuously charged for 10 hours.*

1. Place the handset in the Charger Unit (shown at right).
2. Ensure that charge 1 LED lights. If it does not, make sure that the AC adapter is plugged in and that the handset is making good contact with the Charger Unit.
3. Slide the spare battery in the rear slot of the Charger Unit (shown at right) until it clicks into place.
4. Make sure that the top (marked with plus and minus signs) faces down toward the bottom of the Charger Unit.
5. Ensure that charge 2 LED lights. If it does not, make sure that the AC adapter is plugged in and that the handset is making good contact with the Charger Unit.



Charging Extra Battery Packs

The base unit of your cordless digital telephone is equipped with a battery charger for charging an extra battery pack. This compartment has a latch that keeps the battery pack in place during charging.

Tips on Extending Battery Pack Life

All rechargeable Nickel-Cadmium batteries can develop a "memory" (reduced charge capacity) caused by repeated charge and discharge cycles. Batteries that have developed this effect do not operate to their fullest capacity.

➤ **To avoid memory effect**

➤ Operate the unit until the battery pack is completely discharged before recharging. For example, use the handset off the base all day. Only replace the handset on the base at night after a full day of use. Do not "top off" the charge after using the battery for a short time.

➤ **To erase memory effect**

➤ Operate the unit until the battery pack is completely discharged, then recharge it fully. Repeat this process at least three times.

LCD Low Battery Indicator

When the battery pack in the handset is low and needs to be charged you see this message on the display and the handset beeps. Table 7-7 shows symptoms.

Table 7-7 Low Battery Symptoms

On a Call...	In Standby Mode...
Only the TALK key operates.	None of the keys operate.
Handset beeps once every three seconds	Handset beeps once.
Complete your call as quickly as possible	Cannot make call.
Replace battery pack.	Replace battery pack before making a call.

➤ **To restore your battery capacity**

➤ Return the handset to the base unit for charging or replace the handset battery pack with another charged one.

2000/2500-series Telephones

The 2000/2500-series digital telephones consist of four models:

- DKT2010-S/2510-S – 10-Button Digital Speakerphone
- DKT2020-S/2520-S – 20-button Digital Speakerphone.
- DKT2010-SD/2510-SD – 10-Button Digital Speakerphone with Liquid Crystal Display.
- DKT2020-SD/2520-SD – 20-Button Digital Speakerphone with LCD.
- DKT2020-FDSP (*Not available in the UK & Europe*) – Same as DKT2020-SD with Full-duplex Speakerphone.

2000/2500-series Telephone Option PCBs

Table 7-8 2000/2500 Telephone Subassembly Upgrades

Subassembly	No. per Phone	Function
BVSU or DVSU[1]	1	**Off-hook Call Announce (OCA):** Provides interface for digital telephone to receive Speaker OCA. Not required for Handset/Headset OCA.
BHEU or HHEU	1	**Headset and loud ringing bell telephone interface**: Can be installed with DVSU or DADM, but not with the Full-duplex Speakerphone External Microphone (RFDM). (Installation instructions are in Chapter – Peripheral Installation, see "Telephone (BHEU) to External Speaker (HESB) Cable Connection" on Page 8-18.
DADM2020[1]	1 or 2	**ADM, DSS:** Provides telephone with 20 (or 40 with two DADMs) additional feature buttons for DSS, System or Station speed dial, or Exchange line appearances.

1. Only one of these subassemblies is allowed per telephone: DVSU, BPCI, PDIU-DI or DADM.

Telephone Speaker Off-hook Call Announce Upgrade (DVSU)

To receive Speaker Off-hook Call Announce (OCA) calls over the digital telephone speaker, a 2000/2500-series digital telephone must be upgraded with a DVSU; the telephone making the call does not require a DVSU. Digital telephones do not require an additional wire pair to receive Speaker OCA call.

BVSU/DVSU Upgrade Installation

See Figures 7-25 and 7-31 and follow these steps:

1. Loosen the four captive screws on the telephone base and remove the base.
2. For the BVSU only, make sure that the SW1 and SW2 pins are set per Tables 7-9 and Tables 7-10.
3. Position the BVSU/DVSU PCB on the standoffs, and secure with the four provided screws.
4. Connect the BVSU/DVSU wire plugs to the DVSU connectors on the PCB inside the phone.
5. Reinstall the telephone base and secure it with its four captive screws.

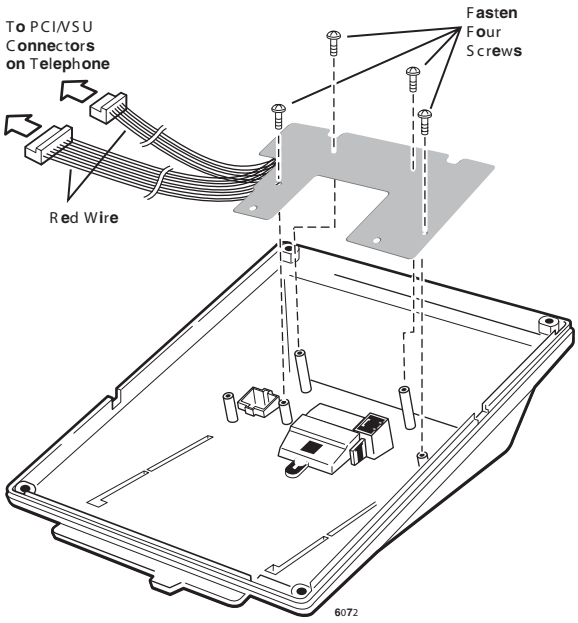


Figure 7-31 BVSU/DVSU Installation

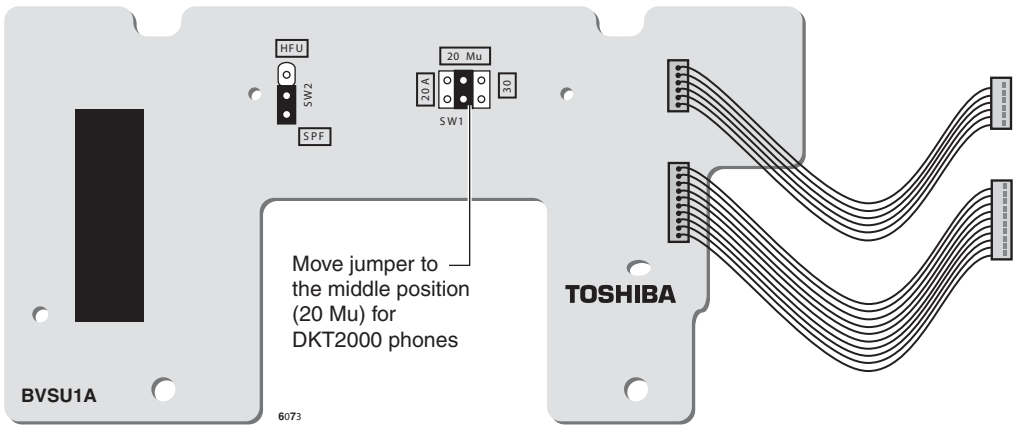


Figure 7-32 Speaker Off-hook Call Announce Upgrade (BVSU1A)

Table 7-9 Mu Law Settings for DKT2010-S, 20-S, 10-SD, 20-SD

SW1	30 (default setting)	20 Mu (Mu Law countries) Use for U.S. and Canada)	20A (A Law countries)
SW2	SPF (default setting). Use for U.S. and Canada)	HFU	

Table 7-10 Mu Law Settings for the DKT2010-H

SW1	30 (default setting)	20 Mu (Mu Law countries) Use for U.S. and Canada)	20A (A Law countries)
SW2	SPF (default setting) Use for U.S. and Canada)	HFU	

HHEU Installation

See Figures 7-25 and 7-33~7-36 and follow these steps:

1. Loosen the four captive screws on the telephone base, and remove the base.
2. Use a screwdriver or other suitable tool to remove the plastic tab on the back of the base. (The HHEU modular connector for the headset is accessed through this opening.)
3. If installing a V.3 HHEU1, set the SW601 switch on the HHEU to headset for the headset or loud bell application.

   V.4 HHEU1 and HHEU2 do not have this switch, because they are automatically set for the headset/loud bell application.

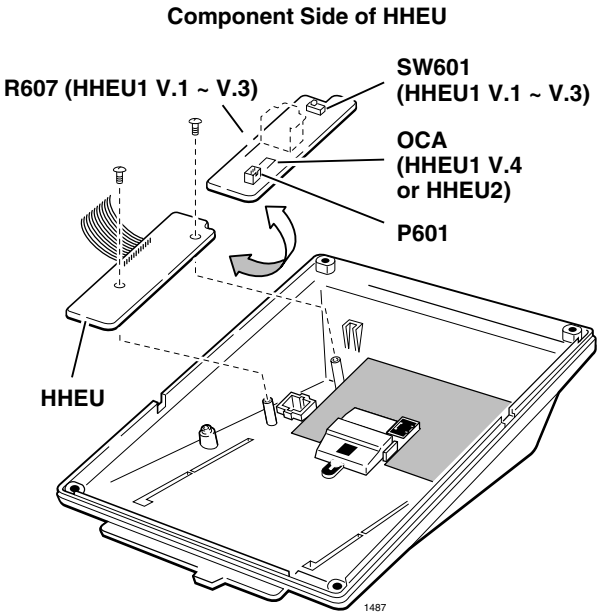


Figure 7-33 HHEU Installation

4. Connect the HESC-65A cable to P601 of the HHEU (both HHEU1A versions and the HHEU2 have P601) if the Loud Ringing Bell option is required.

   Refer to Chapter 8 – Peripheral Installation for HESB installation procedures.

5. For the V.3 HHEU1: If only the headset is connected to the HHEU, cut both sides of the R607 resistor, then remove the resistor to eliminate electrical contact.

   Note Do not cut the R607 resistor if connecting an HESB to the HHEU for the Loud Ringing Bell–even if a headset is also installed on the HHEU.

   ...or

   For the V.4 HHEU1 and the HHEU2: if only the headset is connected to the HHEU, cut the speaker OCA strap.

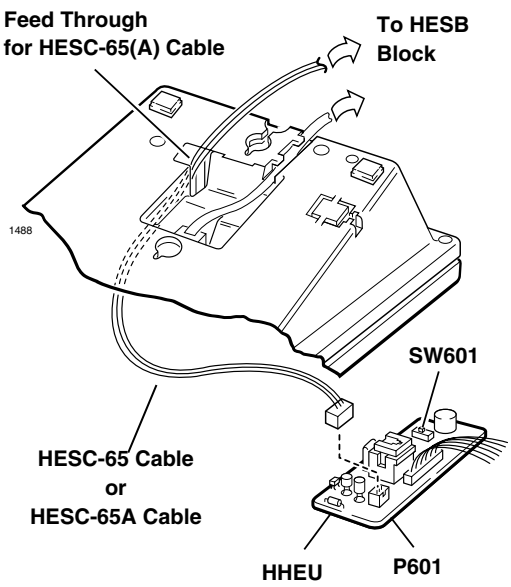


Figure 7-34 HESC-65A Cabling

   Note Do not cut the speaker OCA strap if connecting an HESB to the HHEU for the Loud Ringing Bell–even if a headset is also installed on the HHEU.

6. Position the HHEU PCB on the standoffs inside the base, and secure with the two provided screws.

   Note See Figures 7-35~7-36 for Steps 7~8.

7. Connect the wire plug of the HHEU PCB to the HHEU connector on the PCB in the phone.
8. If an HESB will be connected to the HHEU (for Loud Ringing Bell), locate the EX.SP strap on the PCB in the telephone and *cut* the strap.
9. If a headset will be connected to the HHEU, locate and *cut* the HHEU strap on the PCB in the phone.

   Note If the HHEU PCB is removed from the phone, the HHEU strap must be replaced for proper telephone operation.

10. Reinstall the telephone base; secure with the four captive screws.

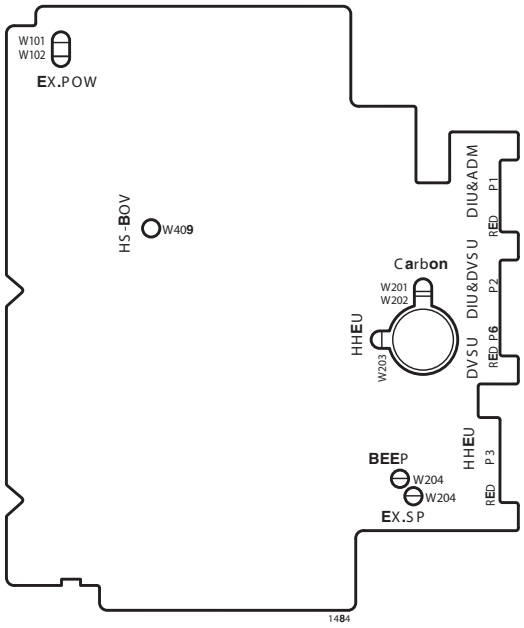


Figure 7-35 DKT2010-S Strap and Connector Locations

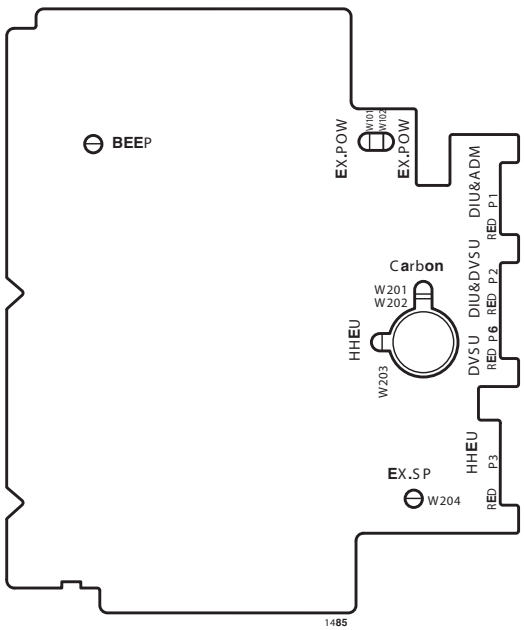


Figure 7-36 DKT2010-SD, DKT2020-S, and DKT2020-SD Strap and Connector Locations

Notes

- *There are two types of HHEUs: the HHEU1 (which has four versions, V.1~V.4) and the HHEU2.*
- *2000/2500-series digital telephones require either an HHEU2 or a V.3 or V.4 HHEU1 for HESB operation; earlier HHEU1 versions are only sufficient for headset operation only.*
- *Only digital telephones equipped with an HHEU2 can be wall mounted. The HHEU2 is identical to the V.4 HHEU1, except that the HHEU2 has longer wires to accommodate wall mounting.*
- *A Toshiba HESC-65A cable is required to connect the HHEU in a digital telephone to the HESB.*

➤ **To adjust the volume of the HESB Loud Ringing Bell**

1. Call the telephone connected to the HESB.
2. Adjust the volume control on the back of the HESB and the ring volume control on the telephone.

Note TAPI and Simultaneous Voice and Data Upgrades (RPCI-DI or PDIU-DI2) for 2000/2500-series Telephones is not available on the Strata CTX.

Carbon Headset/Handset Straps

If a carbon-type handset or headset is connected to the handset jack on the side of the telephone, two jumper straps inside the telephone must be cut.

➤ **To cut the straps**

Note You do not need to cut these straps if the headset is connected to the HHEU.

See Figures 7-25 and 7-35~7-36 and follow these steps:

1. Loosen the four captive screws on the telephone base, and remove the base.
2. For 2000/2500-series digital telephones, and cut the W201 and W202 carbon straps.
3. Reinstall the telephone base, and secure it with its four captive screws.

Beep Strap

A “beep” sounds whenever a dial pad or feature button is pressed on a digital telephone.

➤ **To eliminate the beep sound**

See Figures 7-25 and 7-35~7-36 and follow these steps:

1. Loosen the four captive screws from the telephone base and remove the base.
2. Cut the beep strap.
3. Reinstall the telephone base, and secure it with its four captive screws.

Microphone/Speaker Sensitivity Adjustment (Speakerphones Only)

High ambient noise levels may cause the speaker on some digital telephone speakerphone models to cut off frequently.

➤ **To reduce sensitivity to loud surrounding noise**

➤ Hold down **Mic** button, then press the **Vol** ▲ button. The less-sensitive level will be set after the third flash of the Mic LED.

➤ **To reset the sensitivity back to the normal level**

➤ Hold down the **Mic** button, then press the **Vol** ▼ button. The normal level will be set after the third flash of the Mic LED.

Note On speakerphone models that are set for low sensitivity, the Mic LED flashes at the in-use rate when the speakerphone is used. When set to normal sensitivity, the Mic LED is on steady when using the speakerphone.

Busy Override and Camp-on Ring Tone Over Handset/Headset Option

Busy override and camp-on ring tones can be sent over the DKT handset or headset, in addition to the speaker.

➤ **To send busy override/camp-on ring tones over the handset of the DKT2010-H model**

1. Loosen the four captive screws on the telephone base (Figure 7-25), and remove the base.
2. Install a strap in the HS-BOV W409 location (see Figure).
3. Reinstall the telephone base.

➤ **To send busy override/camp-on ring tones over the handset/headset of the DKT2010-SD/ 2020-S/2020-SD**

➤ Hold down the **Redial** button and press the **Vol ▲** button.

➤ **To block the tone over the handset/headset of the DKT2010-SD/2020-S/2020-SD**

➤ Hold down the **Redial** button and press the **Vol ▼** button.

Note For this to function properly with headsets, make sure the speaker OCA strap or R607 is cut on the HHEU PCB and the HHEU strap is cut on the telephone. (See Figures 7-33, 7-35 and 7-36).

External Power Straps

Digital telephones equipped with options such as integrated data interface units and ADMs require two-pair wiring or external power to operate efficiently at the maximum-allowed distance from the KSU. Two-pair wiring or external power is also necessary for maximum cable run lengths for digital telephones that are connected to systems that must operate with reserve power (see Chapter 3 – Strata CTX670 Installation for more information).

Each digital telephone has two external power straps which must be cut for external power when the cabling of the telephone is connected to an external AC/DC power supply.

➤ **To cut the straps**

See Figures 7-25 and 7-35~7-36 and follow these steps:

1. Loosen the four captive screws on the telephone base and remove the base.
2. Depending on the telephone, locate the W101 and W102 external power straps and cut them.
3. Reinstall the telephone base, and secure it with its four captive screws.

Note Refer to Chapter 6 – MDF PCB Wiring for external AC/DC power supply ordering information and installation instructions.

DIP Switches

The DKT2000/2500 V.4 series telephones have DIP switches that enable use for the international market. The DIP switches are located underneath the flexible button key strip on the DKT2000/2500 V.4 series telephones (see Figure 7-37). On the DKT2001, the DIP switch is located on the base.

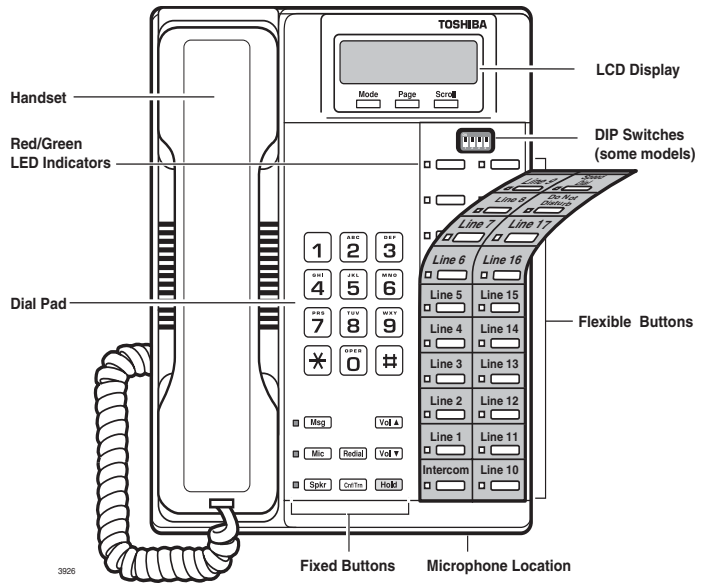


Figure 7-37 DKT 2000/2500-series V.4 DIP Switches

Table 7-11 shows the correct country settings for the DKT2010-S, DKT2020-S, DKT2010-SD, DKT2020-SD, DKT2001 V.4 telephones.

Note The default DIP switch settings are preset for the USA and Canada. Therefore, you do not need to adjust any of these from the default factory settings for North America.

Table 7-11 DKT International DIP Switch Settings (*Not applicable to DKT2500-series*)

Country	DIP Switch				DIP Switch Position
	1	2	3	4	
USA and Canada (Default Setting)	ON	ON	ON	ON	
Mexico	ON	ON	ON	OFF	
Taiwan	OFF	ON	ON	ON	
Hong Kong Thailand[1]	ON	OFF	ON	ON	
Singapore, Malaysia, Indonesia, Sri Lanka, India and China	OFF	OFF	ON	OFF	

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1. The DKT2000 V.4 is not compatible for Hong Kong and Thailand. Use the V.4A or later versions in these two countries.

DKT2020-FDSP Full-Duplex Speakerphone with External Microphone

Note Not available in the UK & Europe.

The DKT2020-FDSP is designed to allow both parties of a speakerphone call to speak simultaneously. This eliminates “clipping” and enables true two-way conversation. However, when two parties are talking simultaneously, the performance is not as good as on a handset. The technology necessitates some volume loss in this situation.

An optional External Microphone can be connected for improved performance. However, the External Microphone is extremely directional and should only be used in certain applications. The telephone also provides half-duplex/full-duplex manual selection.

The DKT2020-FDSP has three operational modes for enhanced microphone use (Best, Good and Normal). These modes allow adjustments for different room acoustical characteristics. Choosing either the Internal or External Microphone (RFDM) and proper operational mode should be pre-selected by the system installer.

When the External Microphone option is installed, the telephone’s Internal Microphone is disabled on all but Voice First Handsfree Answerback calls and OCA calls. The External Microphone is powered by the phone (no batteries are required) and does not need to be turned off when not in use.

Choosing either the Internal or External Microphone is performed on the DIP switch 5, located under the keystrip (see Figure 7-36).

Important!

The DKT2020-FDSP’s full-duplex operation depends on the speaker volume setting. Raising or lowering speaker volume directly affects the performance of the full-duplex operation.

- *Depending on the room’s echo characteristics, raising the volume of the speakerphone can cause the full-duplex operation to deteriorate. When set to maximum volume, it may be necessary to switch to half-duplex operation.*
- The speakerphone will automatically reduce volume in each direction when both the FDSP user and the distant party are talking at the same time. The volume reduction is required to control the echoes at high volume levels. It is possible for surrounding conversations and other sounds to trigger this effect even when you are not speaking.
- The performance of the DKT2020-FDSP can vary on calls that involve a delay, such as wireless calls, Voice Over Internet Protocol calls, etc. With these types of calls, the quality can diminish.
- When using the [PDN] or Intercom button, the performance for internal calls is not as good as for external calls.

DIP Switches

The DKT2020-FDSP has DIP switches that enable the External Microphone and use telephone use in other countries. The DIP switches are under the flexible button key strip (see Figure 7-36).

There are three different DIP switch settings for optimum operation in various types of environments:

- **Best** – provides full-duplex operation with the Internal or External Microphone. This is ideal for a large enclosed area, such as an office with little echo. Echo varies according to the environment. For instance, a room that is relatively empty has more echo than a room with furniture or items that can absorb sound waves.

- **Good** – provides full-duplex operation with the Internal or External Microphone. This is ideal for a small office with high echo.
- **Normal** – provides full-duplex operation with the Internal or External Microphone. This works well with an open office area, such as an office cubicle.

Table 7-12 shows the switch positions for the three different settings.

Table 7-12 DKT2020-FDSP DIP Switch Settings

Full Duplex Setting	DIP Switch							DIP Switch Position
	1	2	3	4	5	6	7	
Best	ON	ON	ON	ON	ON	OFF	ON	
Good	ON	ON	ON	ON	ON	ON	OFF	
Normal (Default)	ON	ON	ON	ON	ON	ON	ON	
DIP Switch 5 ON for Internal Microphone; OFF for External.								

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Note The first four DIP switches are used to select the country, same as all other DK2000/2500-series telephones. The default DIP switch settings (1~4) are preset to On for the USA and Canada. If you need to make adjustments for other countries, see Table 7-11 on Page 7-43.

➤ To use the External Microphone

1. Plug in the RFDM External Microphone to the bottom of the phone (see Figures 7-38 and 7-39).
2. Turn the microphone On by opening it (see Figure 7-40).

Note The High/Low switch works independently from the telephone's speakerphone. This setting must be on High for proper operation.

Important!

- *The microphone has a narrow voice pick-up range so the front of the microphone should always point toward the person speaking (see Figure 7-41).*
- *Be sure to place the microphone at least one foot from the telephone speaker and do not point the microphone toward the telephone speaker grille.*
- *To use the external microphone in a conference room setting, place the microphone away from all parties to eliminate some of the directionality effect. Parties may have to speak up to be heard.*
- *The RFDM External Microphone is not compatible with the HHEU or BHEU.*

CAUTION! Avoid pulling the microphone cord excessively.

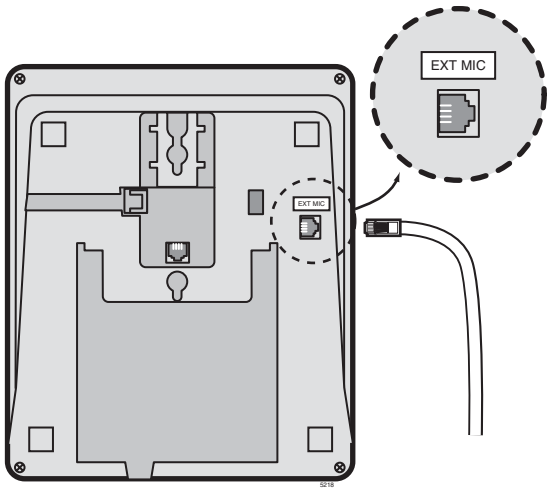


Figure 7-38 RFDM Plug on DKT2020-FDSP

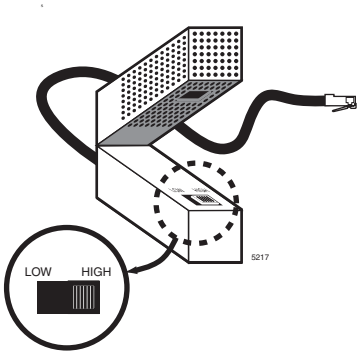


Figure 7-39 RFDM Unit

Figure 7-40 External Microphone On/Off

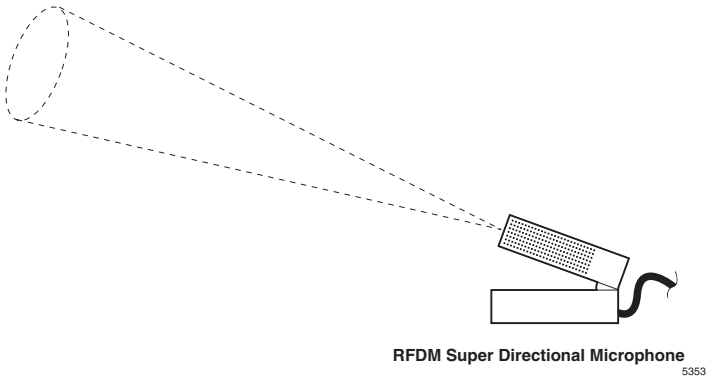


Figure 7-41 External Microphone Voice Pick-up Path

Speech Training Mode

When the DKT2020-FDSP is used in speakerphone mode, it adjusts to both the telephone line's and room's acoustic properties. At the beginning of each speakerphone call, the echo canceller must perform Speech Training by evaluating both the FDSP user and the far-end user's voice, background noise and line quality.

➤ **To train the speakerphone**

➤ The parties at both the local telephone and on the far end should take turns speaking for approximately 10 seconds.

➤ **To improve speaker quality**

➤ If the conversation becomes unstable during the call, or there is clipped speech, feedback or short silences, first try adjusting the volume. This forces the FDSP phone into speech training mode. The LED will go on.

➤ If conversation is still unstable, press button 10 to activate half-duplex mode. You can turn off button 10 at any time to reactivate full-duplex mode.

➤ **To force the telephone into Speech Training mode**

➤ During a call, momentarily press **Vol▲**, **Vol▼**, **Hold** or **MIC**.

During Speech Training mode, the speakerphone operates in half-duplex mode.

Tips for best results

- Avoid blocking the microphone or shuffling paper near the microphone.
- Avoid placing the speakerphone where it can detect excessive background noise, especially during Speech Training mode.
- Avoid moving the telephone during a call—this changes the room's acoustic properties. If the telephone or microphone is moved, you may have to force the Speech Training mode.

Special Button Operation (Button 10)

When using the external or Internal Microphone, button 10 works as a toggle from full- to half-duplex on the DKT2020-FDSP.

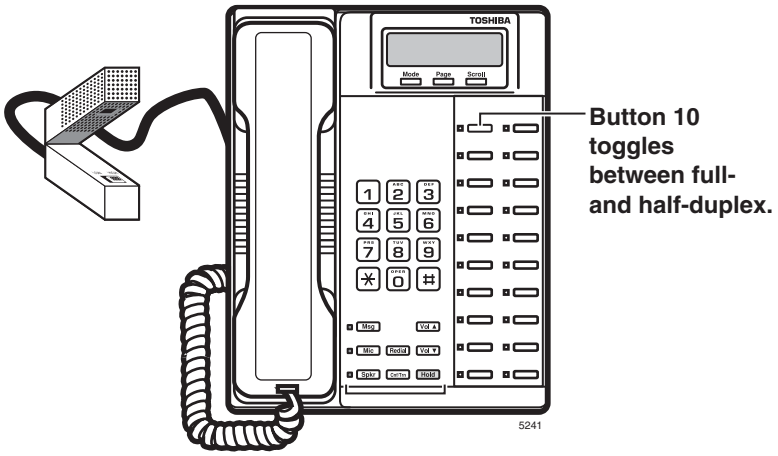


Figure 7-42 Button 10 on the Full-duplex Speakerphone

➤ **To toggle full/half-duplex mode**

➤ Press button 10 (see Figure 7-42) to turn full-duplex mode On or Off.

Full-duplex mode: Button 10 LED Off.

Half-duplex mode: Button 10 LED On.

Notes

- *Button 10 functions the same for Internal and/or External Microphone.*
- *If DIP switch 6 and 7, in Figure 12, are turned Off, the Full/half-duplex function of Button 10 is disabled.*
- *The DKT2020-FDSP's full-duplex operation depends on the speaker volume setting. Raising or lowering the speaker volume directly affects the performance of the full-duplex operation.*

Important!

- *If raising or lowering the volume does not improve performance, switch to half-duplex mode by pressing Key 10.*
- *If both you and the distant party are using full-duplex speakerphones, the sensitivity to both echo paths may cause a reduction or instability of volume. If this happens, it may be necessary to switch to half-duplex mode by pressing key 10.*

Digital Single Line Telephone (DKT2001 only)

For instructions on installing the DKT3001 SLT, see "Digital Telephone System Connection" on Page 7-3.

DKT 2001 Installation

1. Set the DIP switches to match Figure 7-43. The DIP switches are preset from the factory for the USA and Canada. Refer to Table 7-11 on Page 7-43 for other country settings.
2. If required to achieve maximum distance (greater than 305m/1000ft.), install a two-pair house cable (or external power).

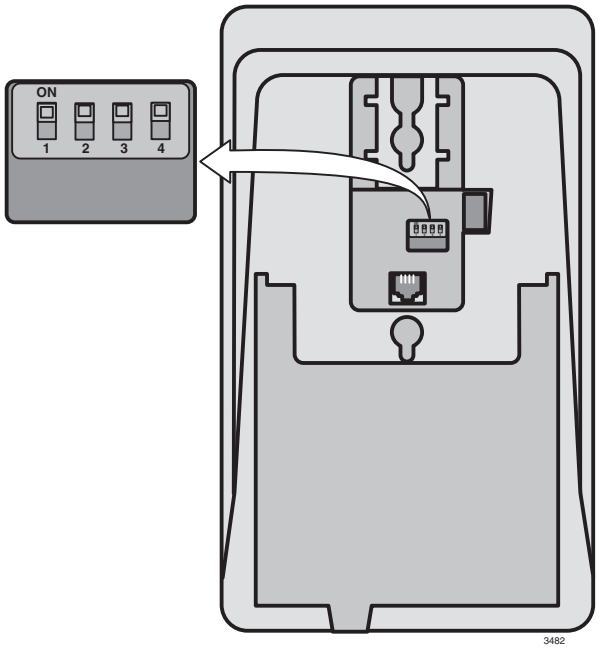


Figure 7-43 DKT2001 DIP Switch Settings

Peripheral Installation 8

This chapter provides information and diagrams for connecting peripheral equipment to the Strata CTX interface circuits. These interfaces include those listed below:

- Application PC and Server Interfaces
  - Strata CTX WinAdmin, ACD, Attendant Console, SMDI and SMDR
- Music-On-Hold/Background Music Interfaces
- External Page with BIOU Interface
- Control Relays with BIOU Interface
- Door Phone/Door Lock with DDCB Interface
- Telephone External Ringer with HESB Interface
- Amplified Page with HESB Interface
- Amplified Page/Talk-Back with HESB Interface
- Power Failure Cut-through with DPFT Interface
- Station Message Detailed Recording

Application PC and Server Interfaces

Application PCs and/or servers are connected to the Strata CTX system via a Network Interface jack, RS-232 serial ports and/or a Strata CTX modem depending on the application. These interfaces are provided by the CTX system processor. The network jack and built-in modem are standard equipment on the CTX670 processor and option PCBs on the CTX100 processor. The BSIS four-port serial interface is an optional PCB that mounts on the CTX100 or CTX670 processor (see Figure 8-1).

- **CTX WinAdmin, Stratagy VM Proprietary Integration, Attendant Console and ACD Network Interface –** These application PC/servers equipped with a standard Network Interface Card (NIC) connect to the Strata CTX network jack. One network interface jack is standard on the Strata CTX670, BBCB processor PCB. The AETS option is required on the CTX100 ACTU processor. This is the only network jack interface on the Strata CTX (see Figures 8-1~8-4).
- **CTX WinAdmin Modem Interface –** CTX WinAdmin PC servers equipped with a modem can connect the Strata CTX maintenance modem. One built-in maintenance Modem is standard on the Strata CTX670, BECU processor PCB. An AMDS option PCB is required for CTX100 ACTU processor PCB.The Strata CTX modem supports point-to-point TCP/IP connection to a CTX WinAdmin PC modem over PSTN telephone lines (see Figure 8-5 for a connection diagrams).

- **SMDR and SMDI or Stratagy VM Serial/RS-232 Interface –** Application PC/servers equipped with standard RS-232 COM ports connect to the Strata CTX serial interface ports. The Strata CTX provides four RS-232 interface jacks on the BSIS PCB. The BSIS is an optional PCB that piggy backs on the system processor PCB (see Figures 8-6 and 8-7 for a connection diagrams). Refer to the *Strata CTX Programming Manual*, Programs 803 and 804 to set up these interfaces.

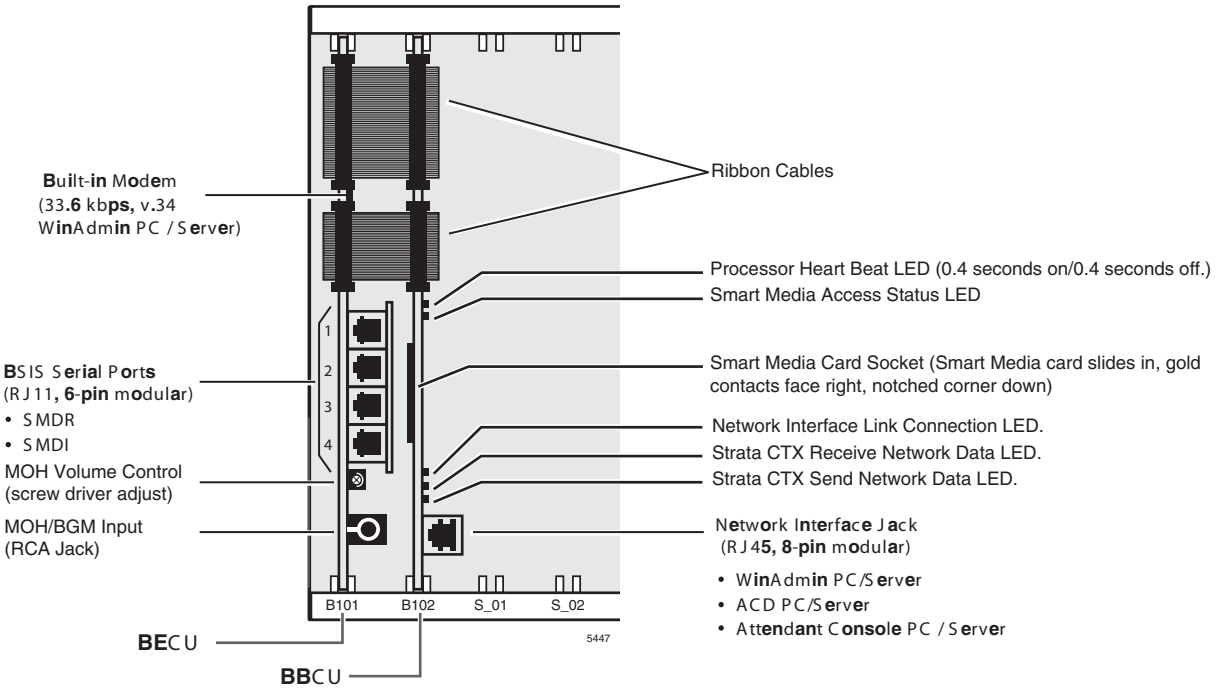


Figure 8-1 Application PC/Server Interfaces

Network Interface Connections

Figure 8-2 shows basic network interface connections. Figure 8-3 shows application PC or server direct connections. Refer to Program 801 to set up the LAN interface. Network jack wiring guidelines are listed below:

- The CTX100 and CTX670 network interface is 10BaseT and requires CAT5 twisted pair cabling.
- The maximum distance between the BBCU network jack and the application PC or server is 100 meters (328 ft.) when using CAT5 cabling without repeaters.
- Unshielded CAT5 cabling is adequate for most installations.
- Shielded CAT5 cabling is needed to protect the cable in environments that have excessive electromagnetic interference (EMI).

Network Jack LED Indications

The three LEDs located on the BBCU and AETS network jack indicate activity when sending or receiving data on the network (see Figure 8-4).

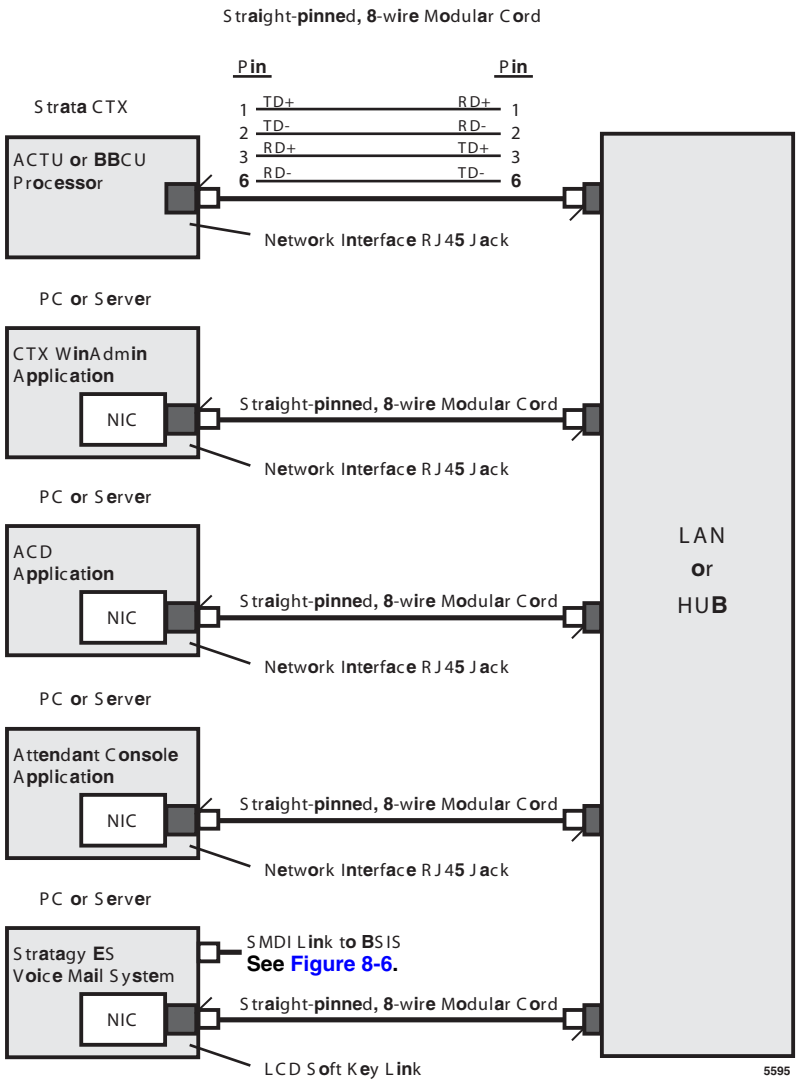


Figure 8-2 Network Interface Connections

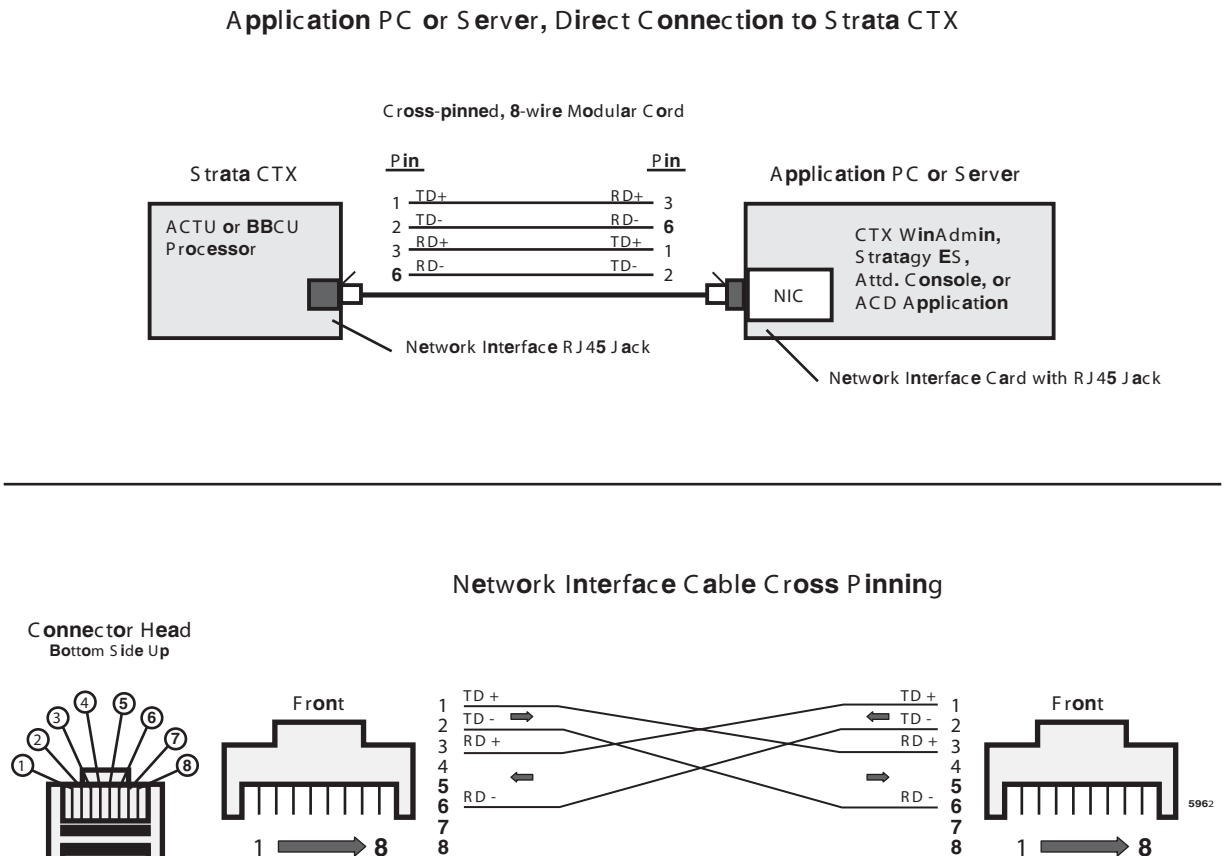


Figure 8-3 Application PC or Server Direct Connection

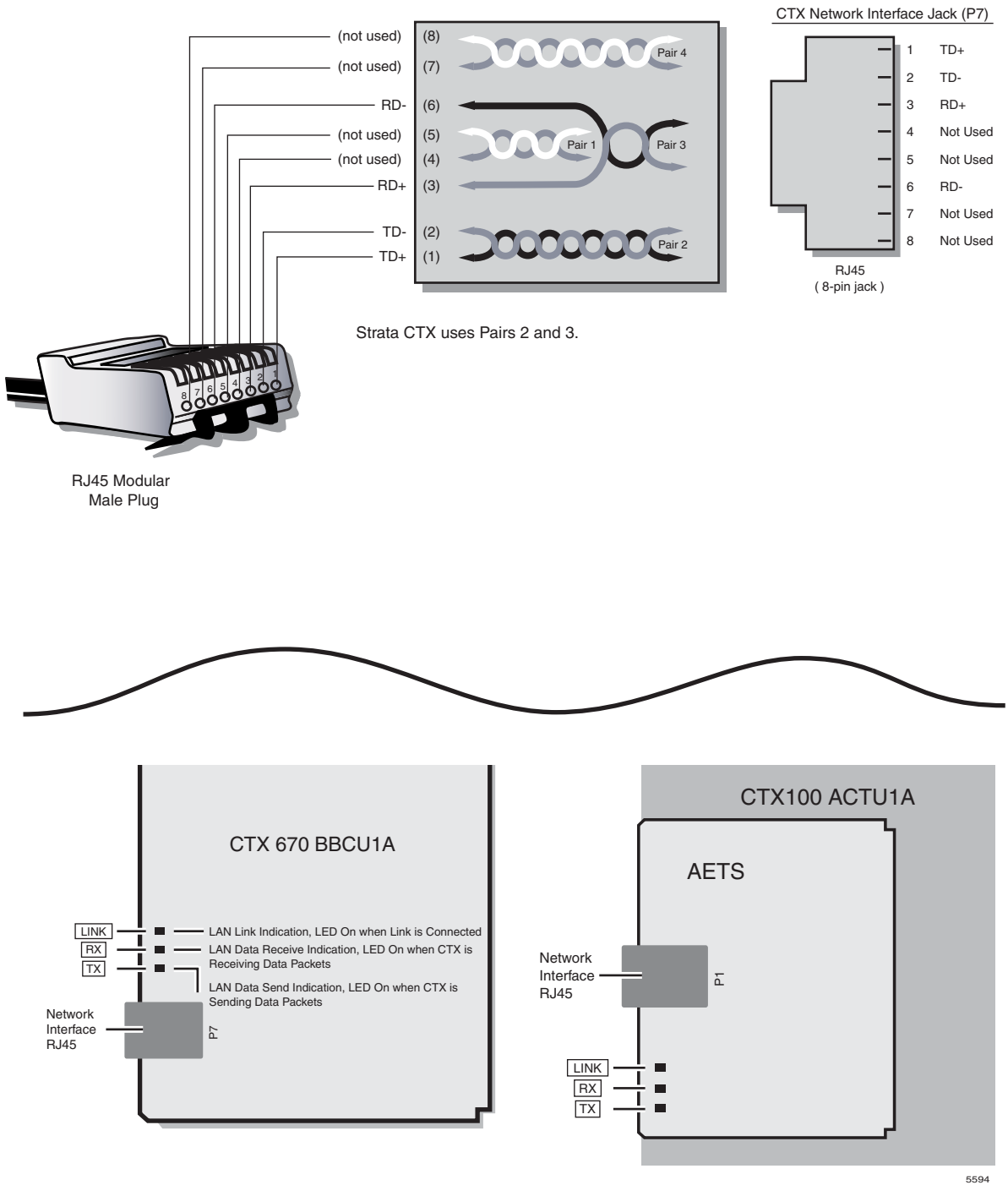


Figure 8-4 Network Interface Jack Pin Numbers and LEDs

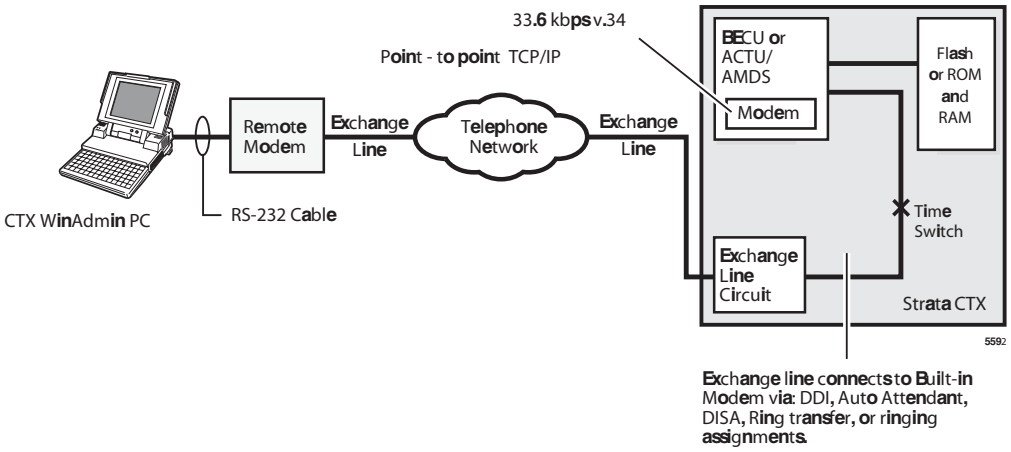
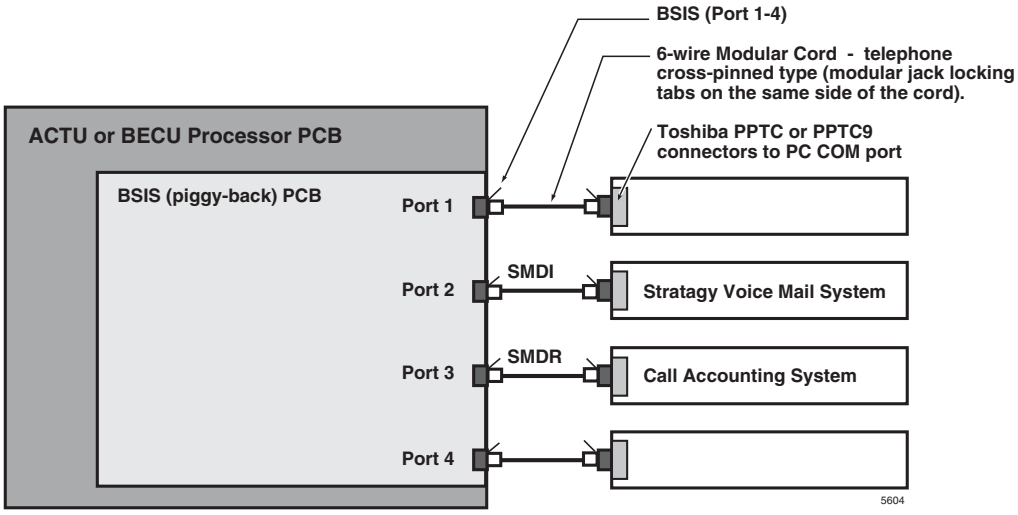


Figure 8-5 CTX WinAdmin Modem Interface Connection



Note: Total data rate four ports combined is 57.6kbps. maximum.

Strata CTX Serial Port Modular Pins:

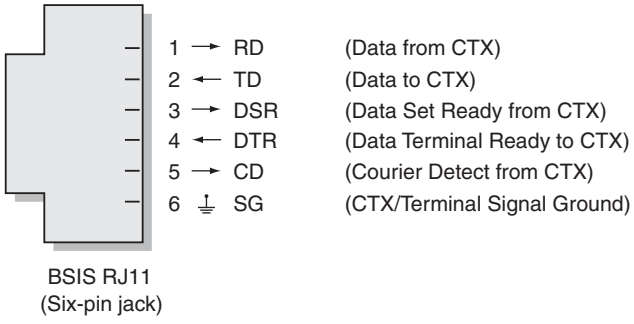


Figure 8-6 Serial Port Interface Connections

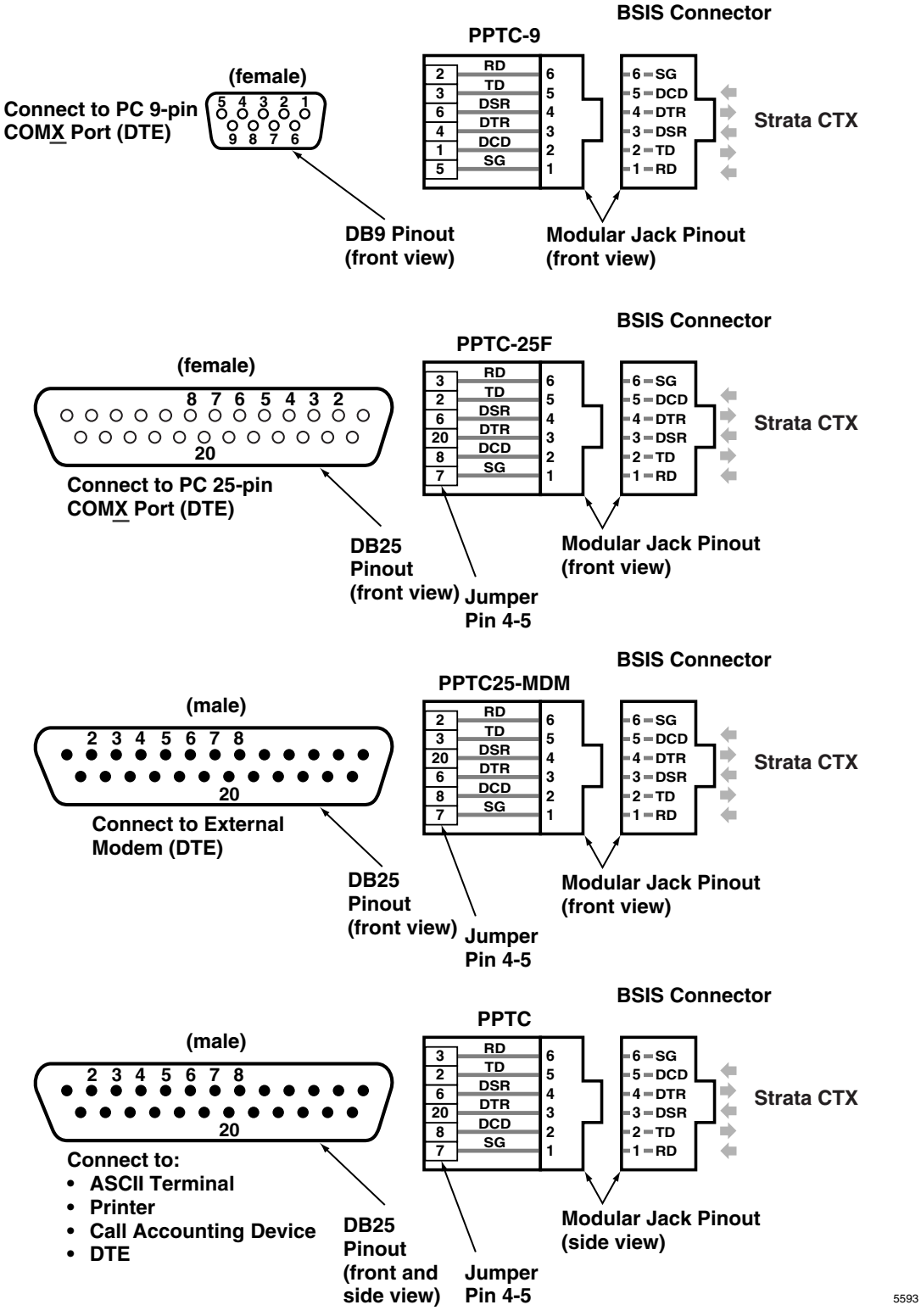


Figure 8-7 Serial Port Adaptors Pin Numbers

Music-On-Hold/Background Music Interfaces

Strata CTX provides up to 15 MOH/BGM music source interfaces via the ACTU or BECU system processor PCB, one or two BIOU optional interface PCBs, and RSTU standard telephone interface PCBs. The destination of each music source is determined by system programming. The music sources can be standard CD music players, telephony MOH machines and/or tape players, etc. The music sources are connected to standard RCA type jacks on ACTU or BECU and BIOU and via a dealer-supplied isolation transformer to RSTU (see Figure 8-8 for a connection diagram).

MOH is sent to callers placed on hold and BGM is sent to DKT telephone speakers and/or external page speakers.

The ACTU, BECU and BIOU interfaces provide an input volume level control for each music source. The volume levels of music sources connected to RSTU circuits rely strictly on the music source volume controls.

MOH/BGM source output requirements:

- Output Impedance: 600 or 8 ohms
- Output voltage level: 0.14VRMS (-15dbm) ~ 0.77VRMS (0dbm).

An additional separate BGM source can be connected to the building's external page amplifier to play music over the paging speakers when the Strata CTX Page is not in use. This interface option requires the BIOU zone relays or mute control (see External Page with BIOU Interface).

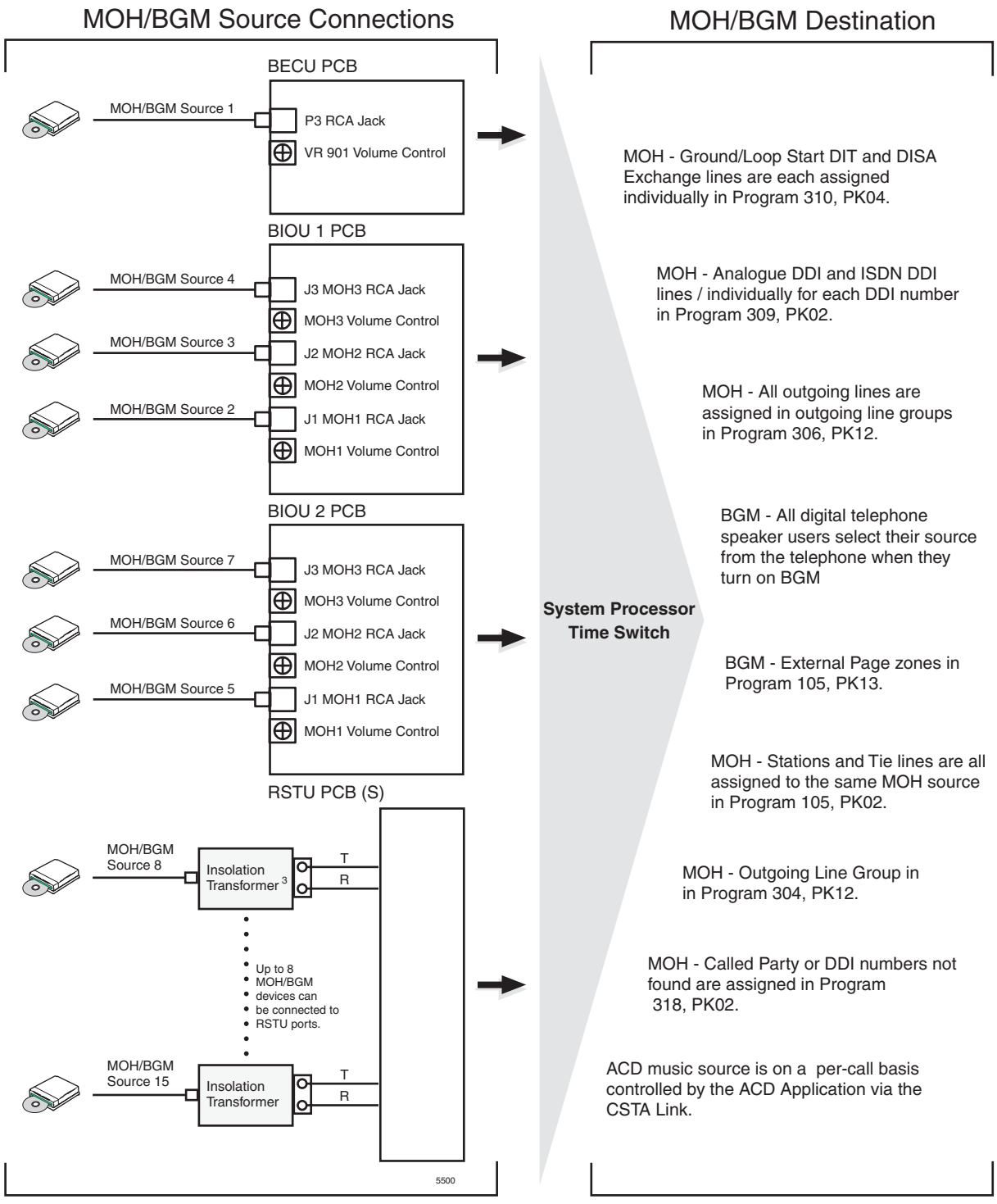


Figure 8-8 MOH/BGM Interface Connection

External Page with BIOU Interface

Up to two BIOU interfaces can be installed for connecting external page equipment. Each BIOU can provide up to four unique page zones for a total of eight page zones maximum per system. The BIOU interfaces can be installed in the main cabinets and/or any remote cabinet. Each BIOU provides a 600ohm, non-amplified page output and an 8 ohm, 3-watt amplified page output. Only one type of page output, amplified or non-amplified, can selected per BIOU in a given installation. The BIOU also provides a control relay which can be used to mute external BGM when the external page circuit is active (see Figures 8-8~8-12 for connection diagrams).

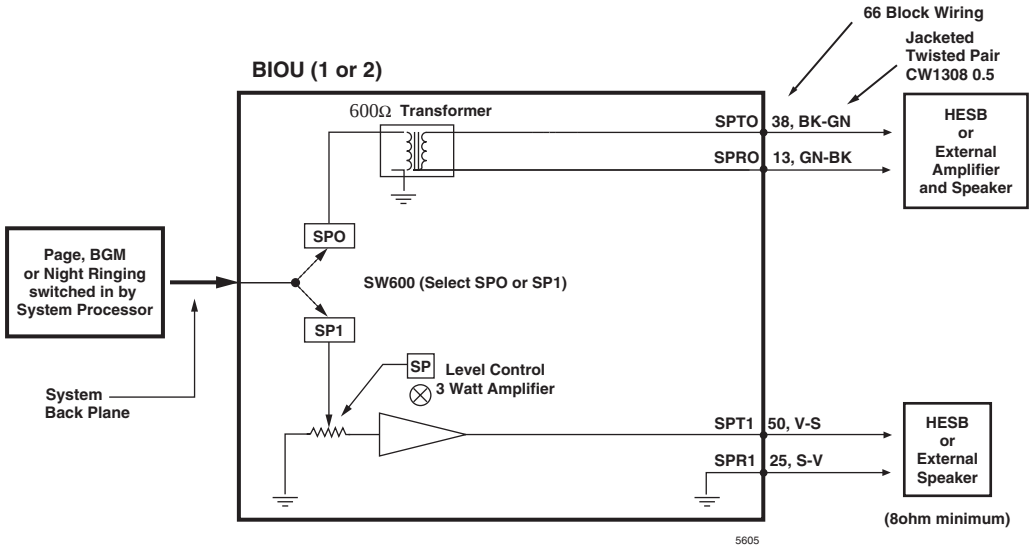


Figure 8-9 Single Zone Page Options

A separate external BGM source can be connected to a building's external Page speakers using the BIOU interface. This enables the BGM sent over the external page speakers to be different from the BGM sent to telephone speakers (see Figures 8-10) for separate BGM over external Page connections).

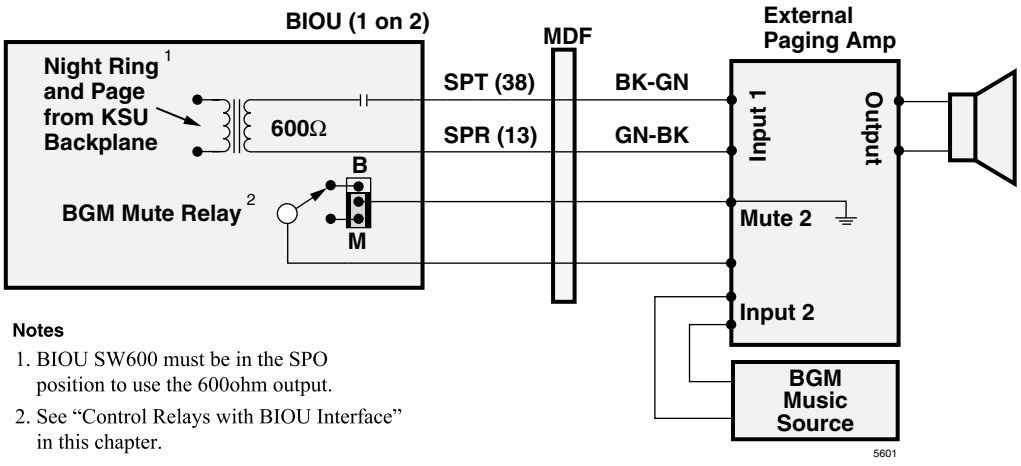
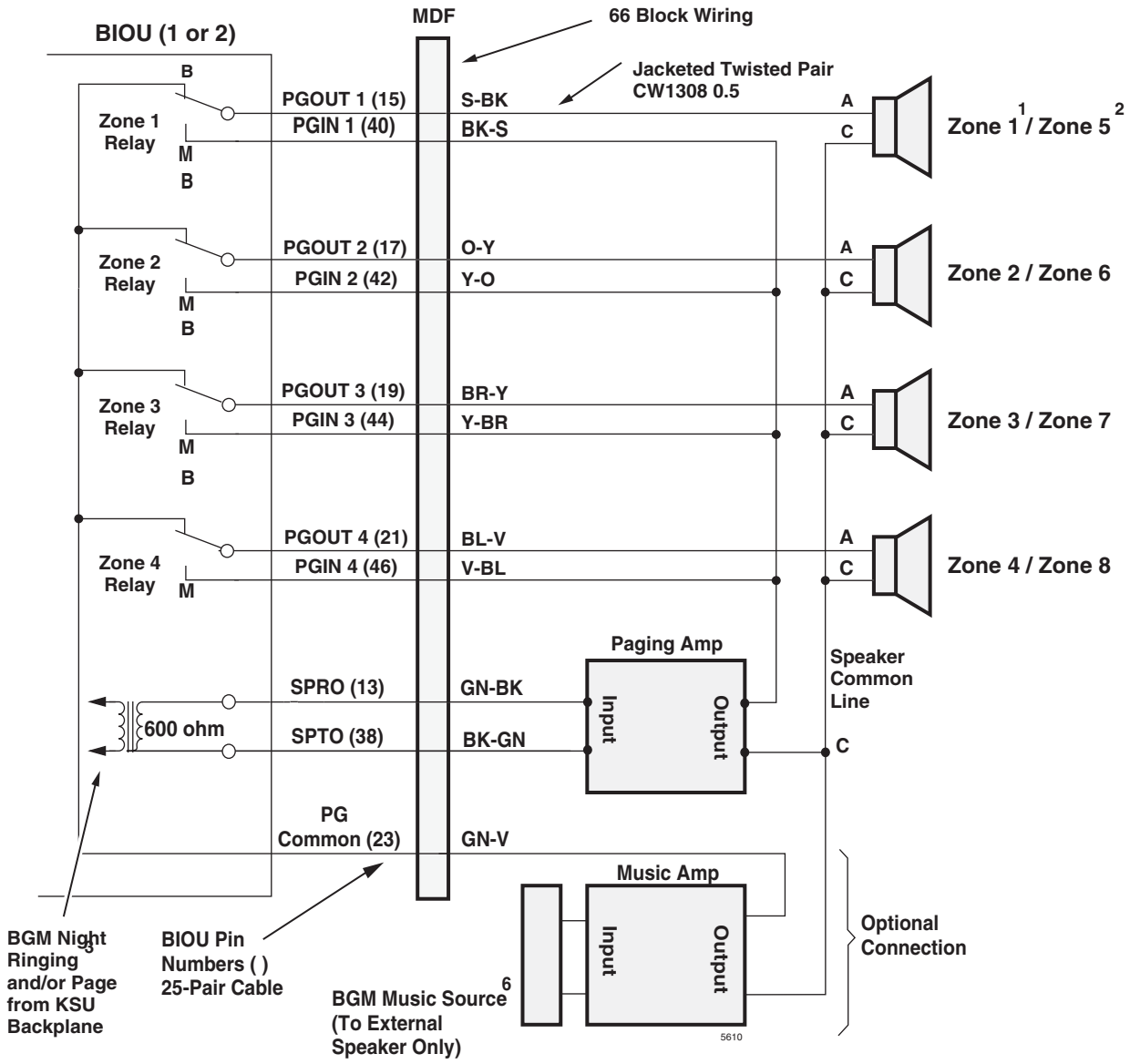


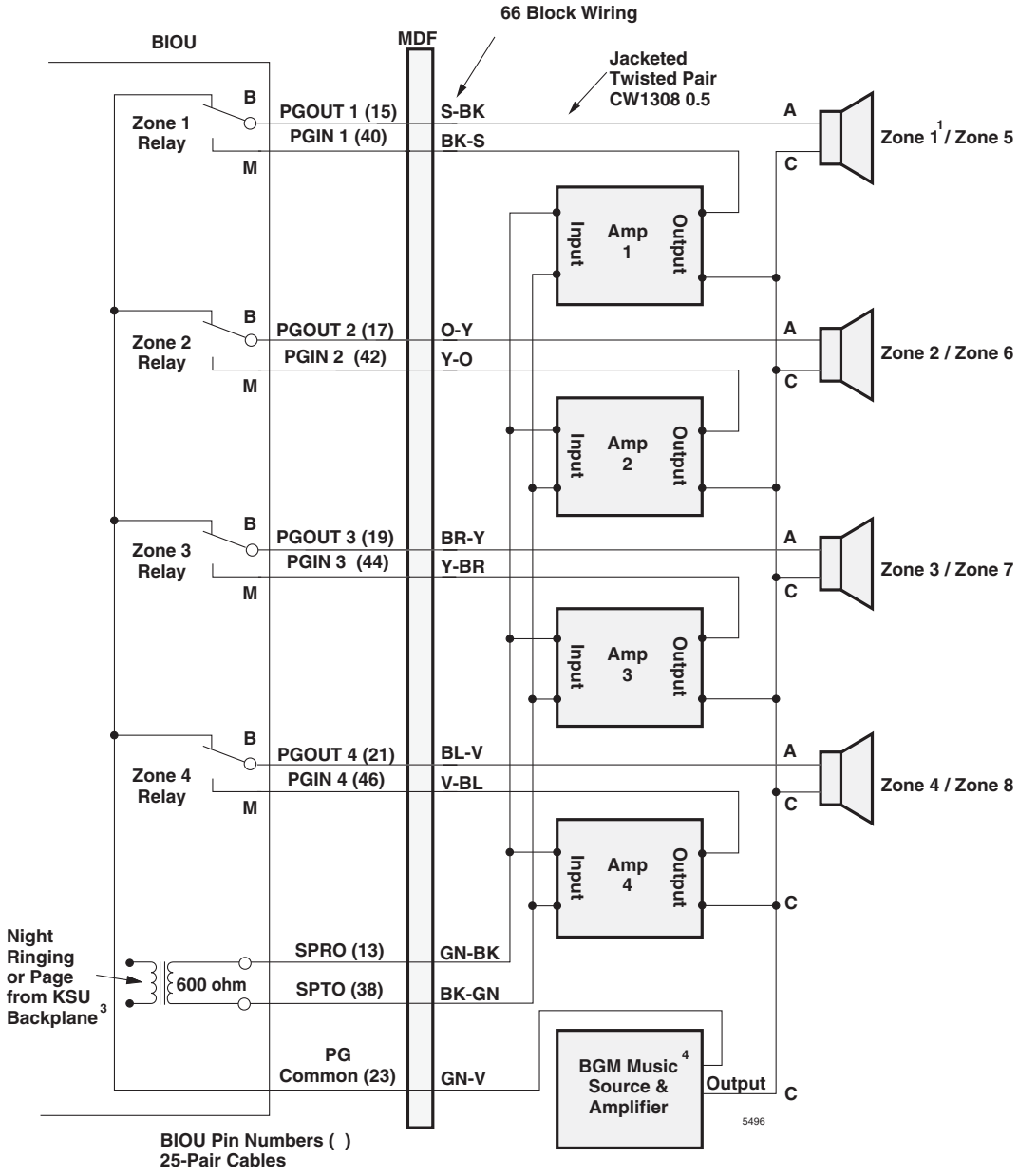
Figure 8-10 Separate BGM Over External Page



Notes

1. Zones 1~ 4 are provided by the BIOU designated BIOU #1.
2. Zones 5 ~ 8 are provided by the BIOU designated BIOU # 2.
3. BIOU SW600 must be set to SPO for 600 ohm page output.
4. Page Zones are added to Page Groups in Program 503.
5. External BGM mute relay control can be provided using BIOU control relay (see Figure 8-12).
6. BGM over External Page with an external Music Amp is optional.
7. BGM via 600 ohm output (SPRO/SPTO) is sent to selected Page Zones per Program 105, FB13 and Program 503.

Figure 8-11 Zone Page with One External Amplifier



The Notes in Figure 8-11 also apply to this figure.

Figure 8-12 Zone Page with Multiple Amplifiers

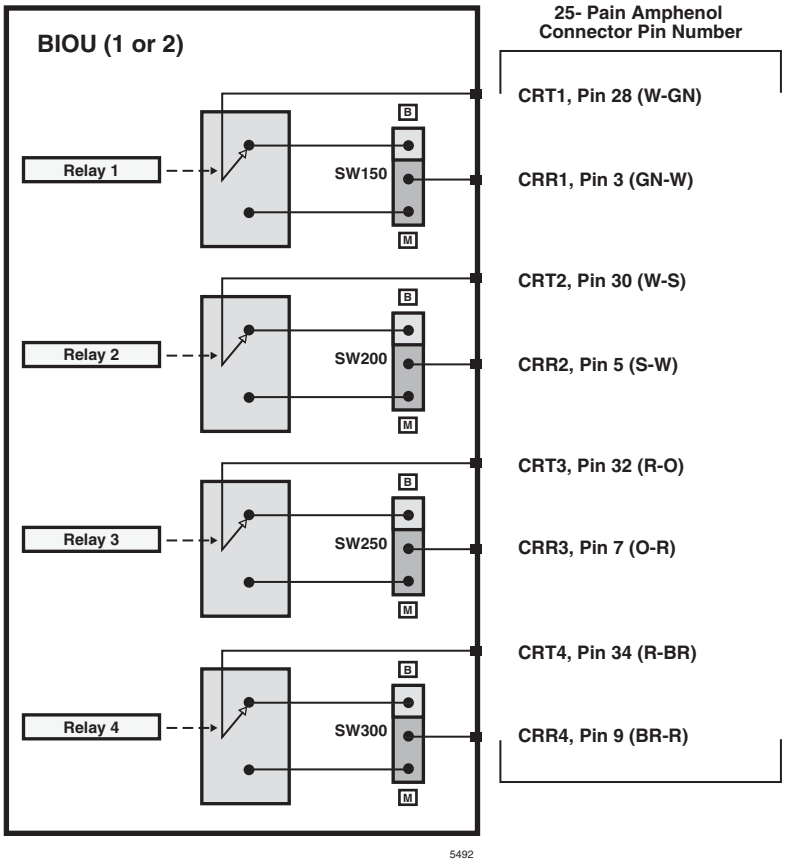
Control Relays with BIOU Interface

Up to two BIOU interfaces can be installed to provide control relays for Night Bell, Night Transfer, Door Lock and BGM mute control. Each BIOU provides four control relays for a total of eight relays (max.) per system. Each relay's function is selected in system programming. BIOU interfaces can be installed in the main cabinets and/or any remote cabinet (see Figure 8-8).

BIOU control relay contact power ratings are shown below:

- 24 VDC maximum
- 1.0 amperes maximum

CAUTION! BIOU relay contacts are not rated to switch 120/240VAC, connecting these voltages may result in equipment damage, fire and/or personal injury.



Notes

1. User Relay Service Program 515 to set control relay for Night Bell, Night, Door Lock, External BGM mute functions as required.
2. Relay functions can open or close contacts by setting Make/Break switches SW150~SW300.
3. Relay functions are set in Programs 503, 508 and 515.
4. Relay contacts are rated at 24 VDC, 1.0A maximum. Do not connect to 120VAC.

Figure 8-13 BIOU Control Relays

Door Phone/Door Lock with DDCB Interface

The Strata CTX supports up to eight DDCB door phone control boxes. Each DDCB supports up to three MDFB door phones which provides a total of up to 24 door phones (see Figure 8-15). Each DDCB can provide a door unlock control relay in place of one of the door phones.

DDCB and MDFB Cabling

For DDCB and MDFB wiring/interconnecting details and door lock control installation procedures and secondary protection information, refer to Chapter 6 – MDF PCB Wiring. If using CW1308 0.5 cable, the length of the cable run from the Strata CTX to the MDFB (via the DDCB) must not exceed 1,000 feet (305 meters).

- DDCB cable runs must not have cable splits (single or double), cable bridges (of any length) or high resistance or faulty cable splices.

DDCB Wall Mounting

The DDCB is designed to be mounted on a wall or other vertical surface.

➤ **To mount the units**

1. Locate the two mounting holes on the right-hand side on the DDCB (see Figure 8-14).
2. Remove the side cover from the DDCB to expose the two left-hand mounting holes.
3. Position the DDCB adjacent to the Base KSU with regard to wiring needs.
4. Secure the DDCB to the mounting surface with four one-inch panhead wood screws.

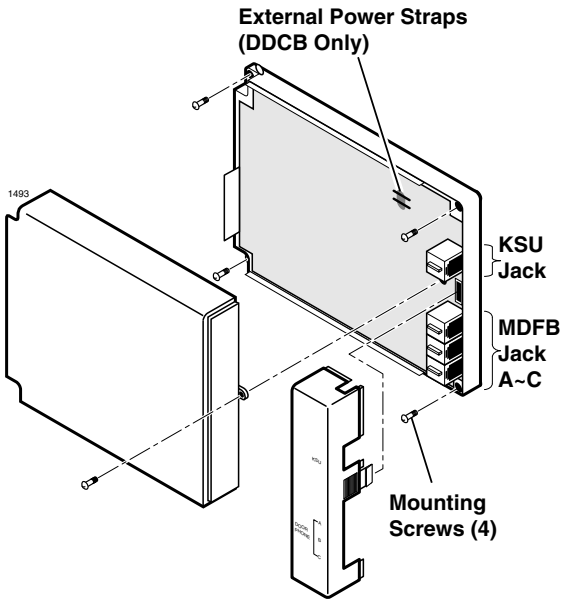


Figure 8-14 Door Phone (DDCB) Installation

Door Phone Wire Connections

Up to 24 door phones can be connected to the Strata CTX system. Door phones are connected as follows: Up to three MDFB, door phones can connect to a single DDCB door phone control box, which in turn connects to a single DKT interface port (See Figure 8-16 for door phone wiring diagram). Only one of the three connected door phones can be active at a given point in time.

Calling from a Door Phone

Each door phone has a push button that rings selected telephones with one of three unique bing-bong sounds. The door phone's location displays on ringing telephone LCDs. The three bing-bong ring types are permanently assigned to each of the DDCB ports (A, B and C) as shown in Figure 8-16. Door phones can also be programmed to ring over the system's external paging equipment. When a telephone answers a door phone call, a two-way talk-path is established between the calling door phone and the called telephone.

Calling a Door Phone

Each door phone has a unique directory number that can be dialled from system telephones. When a system telephone calls a door phone, the door phone does not ring but provides a two-way talk-path between the calling telephone and the called door phone. This enables telephone users to monitor sounds in the general area where the door phone is installed.

Door Lock Control

As an option, Port B of the DDCB can be connected to a door lock control device, instead of a door phone, to unlock a door. The door lock control device is not supplied by Toshiba and must be ordered separately. The door lock option is a hardware jumper located on the DDCB. This option provides relay contacts that will open, or close the Port B wire pair when a telephone's door lock button is pressed or when a door lock feature code is dialled from a telephone (see Figure 8-16 for option settings).

Door Phone/Lock Programming

Door phone assignments are in Program 507 and door lock assignments are in Program 508.

MDFB Wall Mounting

1. Remove the screw from the bottom of the cover. Detach the cover from the base and metal frame (see Figure 8-15).
2. Position the metal frame and base to the mounting surface and secure with two one-inch panhead wood screws.
3. Attach cover to the metal frame and base and secure with the screw which was removed in Step 1.

MDFB Volume Control Adjustments

1. Remove the screw from the bottom of the MDFB cover.
2. Detach the cover from the base and metal frame.
3. The volume level is changed by a screw adjustment on the back of the MDFB. Turn the screw with a flat-headed screwdriver while ringing the MDFB or while on a call with it. The volume level will change as the screw is turned.

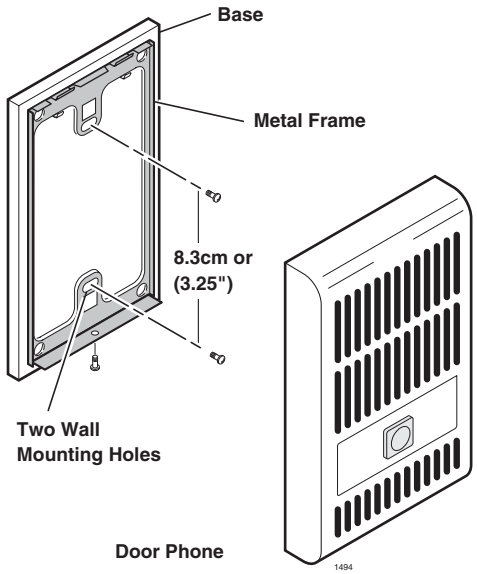
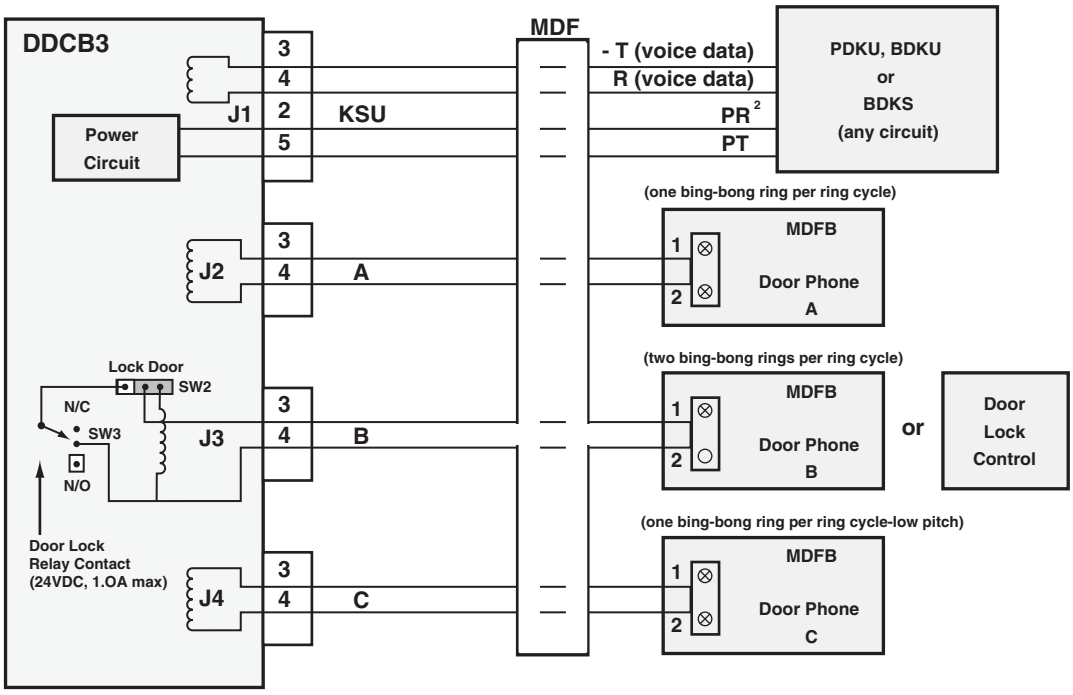


Figure 8-15 Door Phone (MDFB) Installation



Notes

1. MDFB Terminal Pins L1 and L2 are used with HESB Talk Back Amplifies Application only- See Figure 8-22.
2. Not available with BDKS.
3. Refer to Programs 123, 456, and 789.

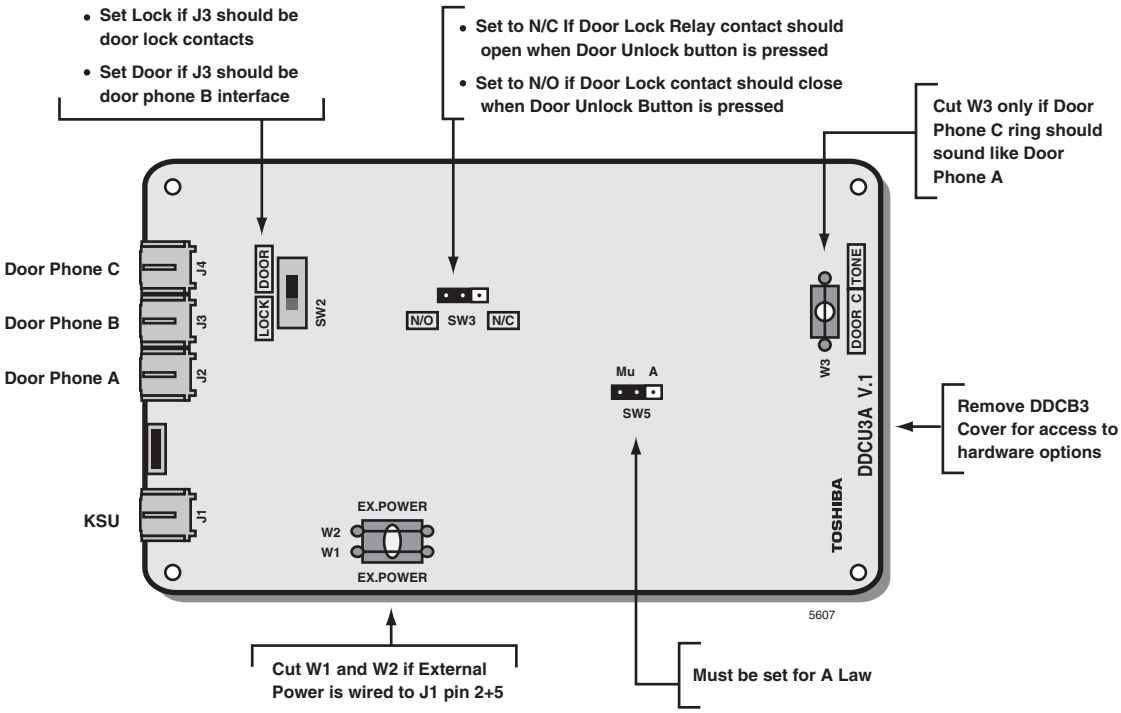


Figure 8-16 DDCB3 Wiring and DDCU Door Lock PCB

External Speaker Unit (HESB) Options

Strata CTX systems provide three options utilising an HESB:

- Telephone External Ringer
- Amplified Page Speaker
- Talkback Amplified Page Speaker with talkback

System hardware requirements vary depending on the HESB option selected. See the following installation procedures for the hardware requirements for each option.

Telephone External Ringer

The loud ringing bell option enables the voice first or ringing signal tone to be amplified without the use of other manufacturers' equipment. The voice first and signal tone can be amplified on all digital telephones equipped with HHEU PCBs and HESB. (See Chapter 7 – Station Apparatus.)

The HESB automatically turns Off once the ringing call or voice first has been manually answered from the digital telephone. This turn-off feature prevents audio feedback problems.

Important! ***For UK & European markets a 240VAC to 12VDC plug to power supply must be provided by the dealer.***

Step 1: Set Up the Telephone for the External Ringer Option

3000/3500 Telephone Instructions

➤ **To Turn the Loud Ringing Bell Feature On/Off (Default is Off)**

1. Press **369**+**Hold** (simultaneously).
2. Press **# 8**.
3. Press **Msg** (**Msg** LED turns On) to turn On the External Speaker (HESB) connection

   ...or press **Msg** again (**Msg** LED turns Off) to turn Off the External Speaker (HESB) connection.
4. Press **Hold**.

2000/2500 Telephone Instructions

Important! *See Chapter 7 – Station Apparatus for instructions on the HHEU jumpers and cutting the EXSP on 2000-series digital telephones. See below for 3000/3500 telephones.*

Step 2: Connect the HESB External Ringer to the 3000/3500-series Telephone

1. Connect a jumper between terminals 2 and 10 on the HESB TB1 terminal block (Figure 8-21).
2. Connect a jumper between terminals 4 and 5 on the HESB TB2 terminal block.
3. Install a BHEU PCB and HESC-65A cable per Figures 8-17 and 8-18.

Note HESB connections made in Steps 4~6 can be accomplished using the HESB VOICE modular jack instead of the TB1 terminal block.

4. Connect terminal 1 of the HESB TB1 terminal block to the red (+) wire of the HESC-65A using a modular block.

5. Connect terminal 2 of the HESB TB1 terminal block to the green (-) wire of the HESC-65A using a modular block.
6. Connect terminal 8 of the HESB TB1 terminal block to the yellow (L2) wire of the HESC-65A cable using a modular block.
7. Connect the HACU-120 power supply's +12V lead to terminal 1 of the HESB TB2 terminal block, and connect the power supply's 0V lead to terminal 2.
8. Plug the provided power cord into the power supply and into a 240VAC, 50Hz power source.

Important! *If AC voltage is not within range, have a qualified electrician correct the problem.*

Telephone (BHEU) to External Speaker (HESB) Cable Connection

The HESC-65A cable is required to connect the telephone BHEU to the HESB external speaker. The BHEU can be installed into the DKT3000/3500-series telephones. It can also be installed into DKT3010 and DKT3020 telephones that have either a BVSU or BPCI installed. For DKT3001 telephones, the installation is same as below, only the connector location is different.

HESC-65A and BHEU Installation

1. Loosen the four captive screws on the telephone base, and remove the base. Use a screwdriver or other suitable tool to remove the plastic tab on the back of the base. (The HESC-65 cable connector is accessed through this opening. See Figure 8-17.)
2. Connect the HESC cable to P1 of the BHEU and feed it through the telephone base.
3. Position the BHEU PCB (component side down) on the standoffs inside the base, and secure with the two provided screws (see Figure 8-18).
4. Connect the BHEU integrated wire plug to P3 (HEU) on the telephone base PCB (see Figure 8-19). Note the location of the red wire

   ...or for DKT3001 telephones only, connect the BHEU wire plug to P1 (HEU) on the telephone base PCB (see Figure 8-20). Note the location of the red wire.
5. Reinstall the base on the telephone.
6. Connect the HESC-65A cable to the HESB (see Figure 8-17).
7. Connect station wiring (see Figure 8-21).

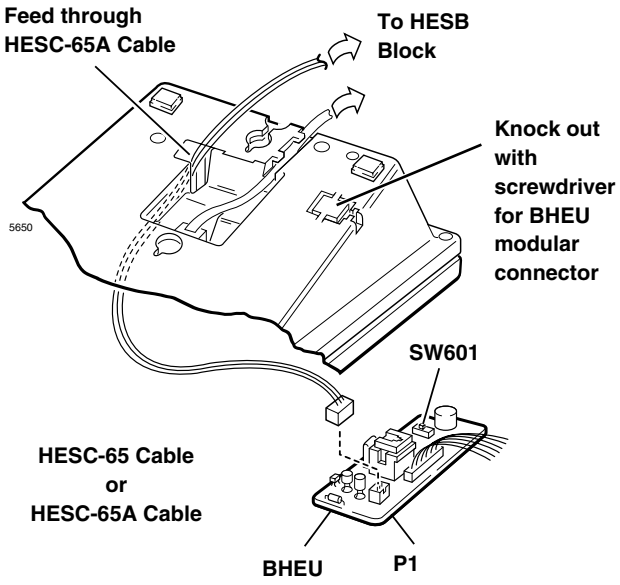


Figure 8-17 HESC-65A Cabling

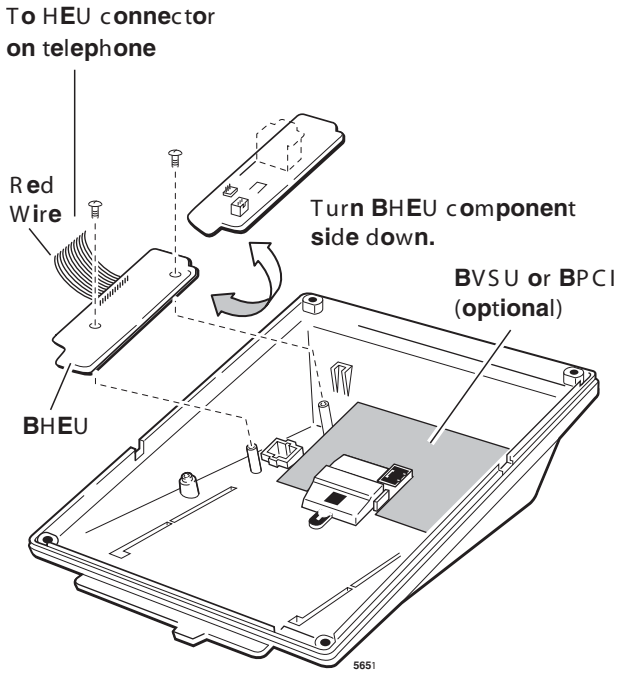


Figure 8-18 BHEU Installation

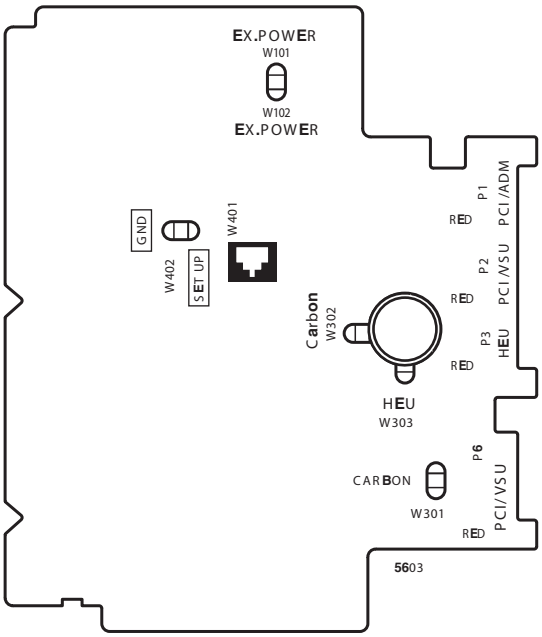


Figure 8-19 DKT3010, DKT3020, DKT3014 Strap and Connector Locations

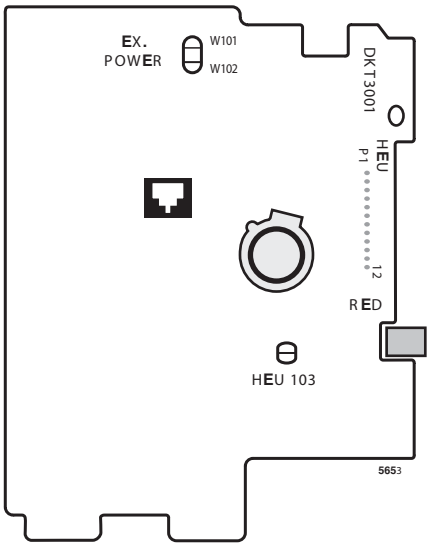


Figure 8-20 DKT3001 BHEU Connector Location

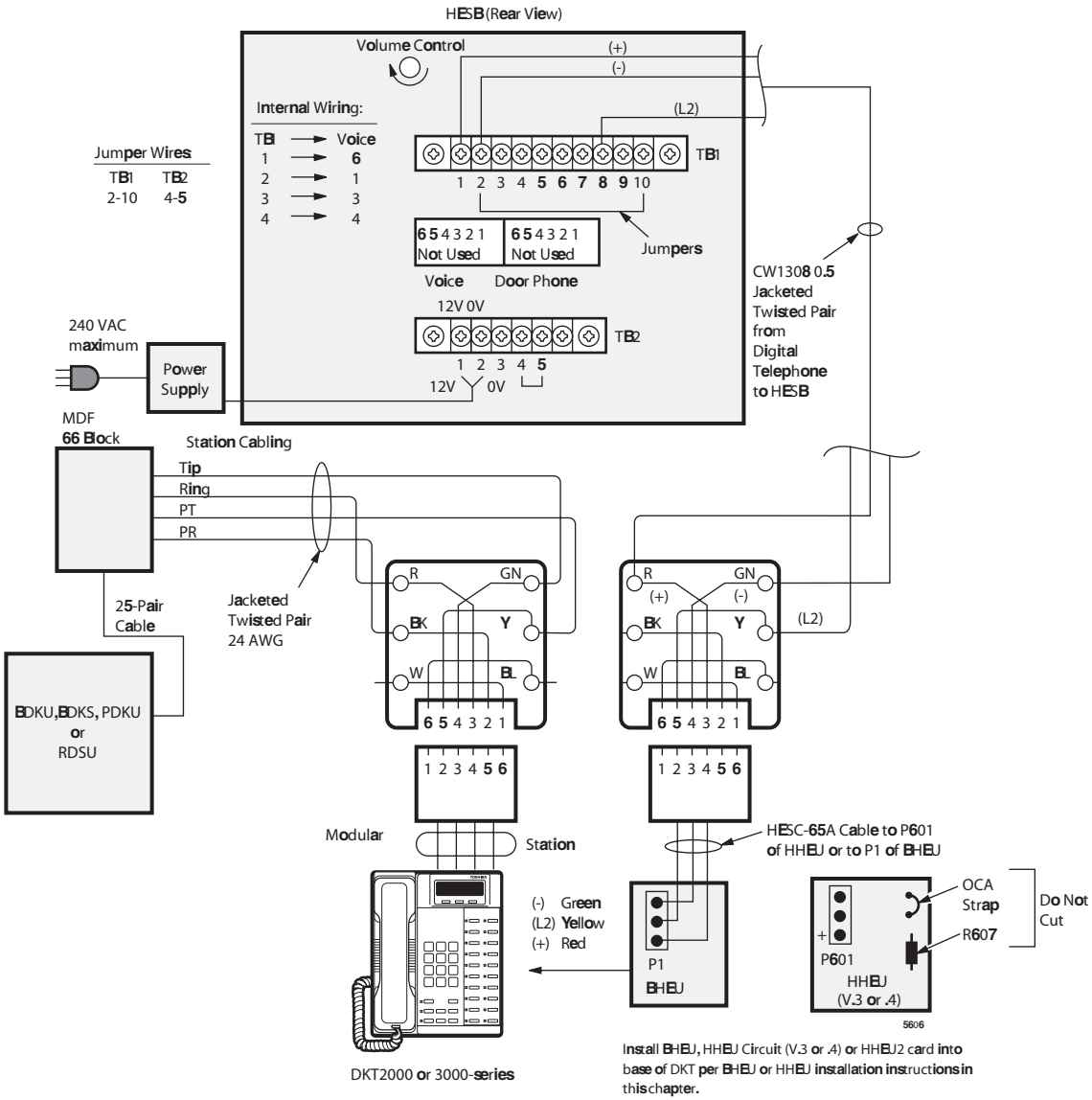


Figure 8-21 Wiring the Telephone External Ringer with HESB Interface

Step 3: Test the Telephone External Ringer Option

1. Test the AC input voltage by plugging power cord into the power supply and to a 240VAC power source.
2. Make an Exchange or station call to the station configured for the loud ringing bell. Ringing will be heard over the HESB.
3. Use a small, slotted screwdriver to turn the volume control on the back of the HESB to the desired level and adjust the ring volume control on the telephone.
4. If ringing is heard at the station, but not over the HESB, check the following while the station is ringing:
   - Using a suitable voltmeter, measure voltage across terminals 1 (+) and 2 (-) of the HESB TB1 terminal block. Voltage indication should be 4.5~5VDC.

Note Ringing stops once the call is manually answered. There should be NO voltage potential across terminals 1 and 2.

   - If voltage is not as specified during ringing, check that the telephone wiring connections to the HESB have been made properly (wires to terminals 1 and 2 of the HESB TB1 terminal block may have been reversed).

Amplified Page Speaker Option

The amplified speaker option enables the HESB to be configured as a paging speaker. The HESB is connected to the BIOU 600-ohm page output to provide an amplified external speaker.

➤ **To install the HESB amplified speaker option**

1. Connect a jumper between terminals 1 and 2 of the HESB TB1 terminal block (see Figure 8-22).
2. Connect a jumper between terminals 6 and 7 of the HESB TB1 terminal block.
3. Connect a jumper between terminals 5 and 8 of the HESB TB1 terminal block.
4. Connect a jumper between terminals 3 and 4 of the HESB TB2 terminal block.
5. Connect a jumper between terminals 5 and 6 of the HESB TB2 terminal block.
6. Connect the BIOU 600-ohm page output (pins 13 and 38) to terminals 3 and 4 of the HESB TB1 terminal block.
7. Connect the power supply's +12V lead to terminal 1 of the HESB TB2 terminal block, and connect the 0V lead to terminal 2.
8. Plug the provided power cord into the power supply and to a 240VAC power source.
9. Set the BIOU SW600 switch to the SPO position.

Important! *If AC voltage is not within range, have a qualified electrician correct the problem.*

➤ **To test the amplified speaker option**

1. Make an external page. The page should be heard over the HESB.
2. Verify that someone speaking into the door phone can be heard at the paging station. (With this application, pressing the door phone button is not required to talk back through the door phone.)

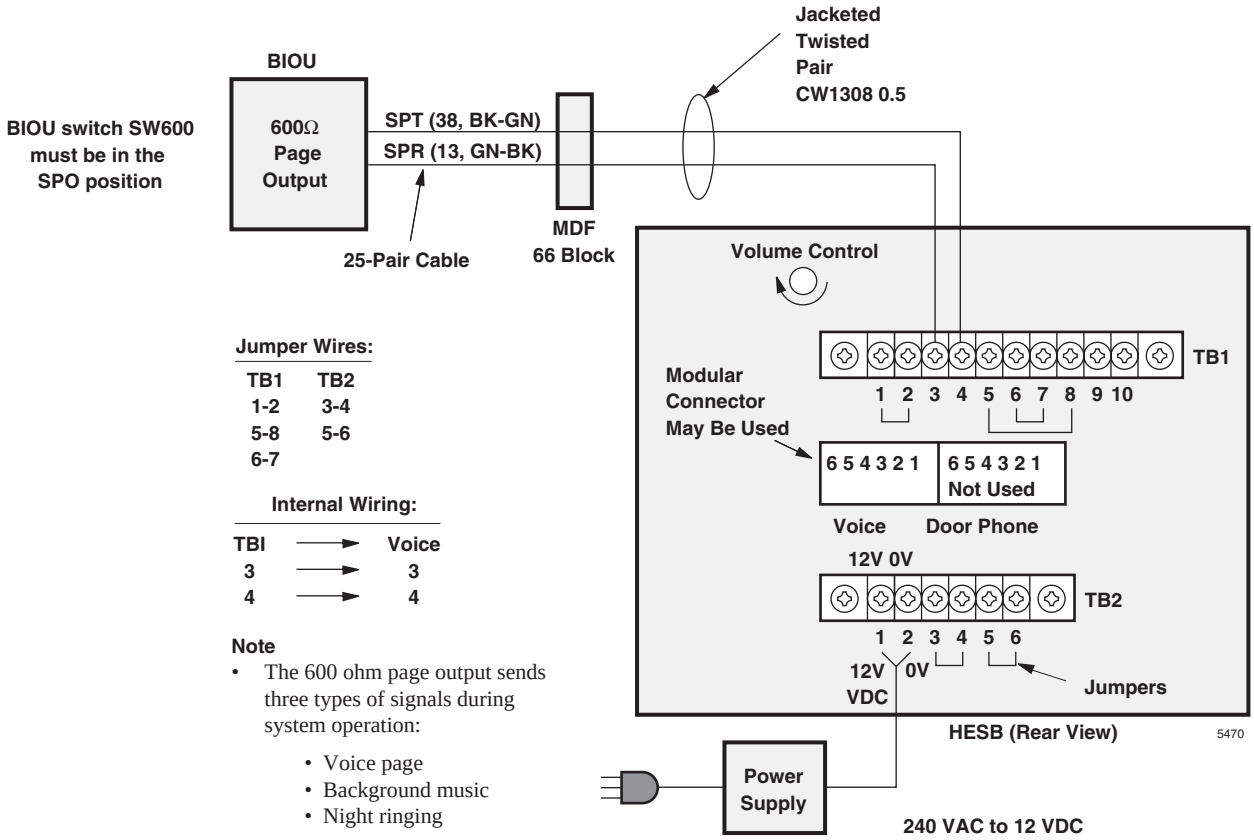


Figure 8-22 Amplified Page Speaker with HESB Interface

Talkback Amplified Page Speaker with Talkback Option

The talkback amplified speaker option enables a talkback speaker to be provided in areas where a telephone is not needed. In this configuration, the HESB is connected to the BIOU 600 ohm (duplex) output and is used as the amplifier and speaker.

A door phone unit (MDFB) is connected to the HESB, and serves as a microphone to provide talkback operation. (The MDFB push-button is inoperative, and the unit serves only as a microphone for talkback and not as the normal door phone.)

Note The BIOU 600 ohm is a two-way (duplex) page output compatible with most commercially available talkback amplifiers – door phone not required for talkback.

➤ **To install the HESB amplified page speaker with talkback**

1. Connect a jumper between terminals 1 and 2 of the HESB TB1 terminal block (see Figure 8-23).
2. Connect a jumper between terminals 3 and 4 of the HESB TB2 terminal block.
3. Connect a jumper between terminals 5 and 6 of the HESB TB2 terminal block.

Note HESB connections made in Steps 4~7 may be accomplished using the HESB VOICE and door phone modular jack instead of the TB1 terminal block.

4. Connect terminal 7 of the HESB TB1 terminal block to Pin L1 of the MDFB.
5. Connect terminal 8 of the HESB TB1 terminal block to Pin L2 of the MDFB
6. Connect terminal 9 of the HESB TB1 terminal block to Pin 1 of the MDFB.
7. Connect terminal 10 of the HESB TB1 terminal block to Pin 2 of the MDFB.
8. Connect the BIOU 600-ohm page output (pins 13 and 38) to terminals 3 and 4 of the HESB TB1 terminal block.
9. Set the BIOU SW600 switch to the SPO position.
10. Connect the customer supplied +12V lead to terminal 1 of the HESB TB2 terminal block, and connect the 0V lead to terminal 2.
11. Plug the provided power cord into the power supply and to a 240VAC power source.

Important! *If AC voltage is not within range, have a qualified electrician correct the problem.*

➤ **To test the talkback amplified speaker**

1. Make an external page. Page will be heard over the HESB.
2. Verify that someone speaking into the door phone can be heard at the paging station. (With this application, pressing the door phone button is not required to talk back through the door phone.)

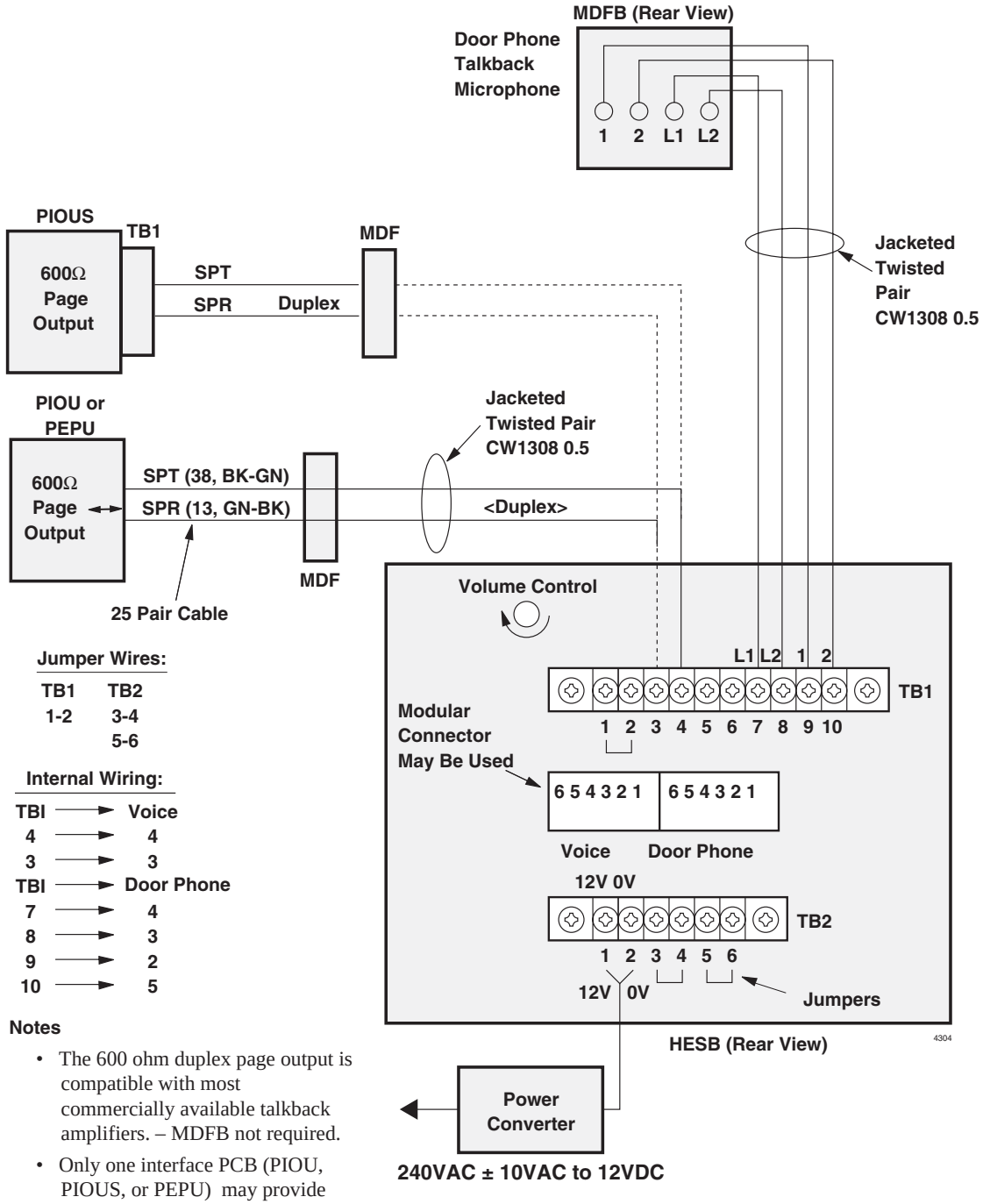


Figure 8-23 Amplified Page/Talk-Back with HESB Interface

HESB Wall Mounting

Some applications may require that the HESB is mounted on a wall or other vertical surface.

➤ **To wall mount the HESB**

1. Find a suitable location on the mounting surface for the HESB (see Figure 8-24).
2. Screw a 1.25-inch panhead wood screw into the mounting surface.
3. Hang the HESB from the screw.

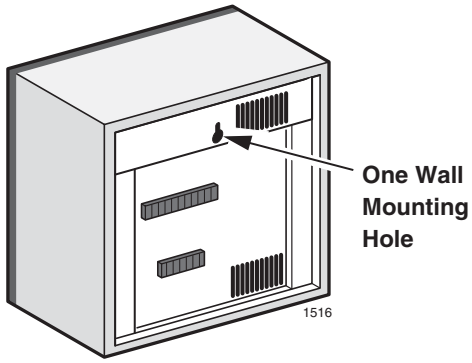


Figure 8-24 HESB Wall Mounting

T001B Relay Unit Options

The T001B unit provides a relay that can be activated by the ringing generated by a digital or electronic key telephone. The device attatched to the T001B needs to be independantly powered with a 12VDC supply (this power supply is supplied as standard with every T001B unit). The relay inside the T001B unit will close as soon as it detects the ringing of the extension being called and will activate the device connected. A HHEU must also be installed in the telephone and a HESC65 (or HESC65A) cable fitted (see Chapter 7 – Station Apparatus). The devices that can be connected to the T001B unit are as follows:

- A loud ringing Bell/Klaxon
- A flashing Light
- An Electronic Alarm/Siren

Note Care must be taken in choosing the device to be connected, as when the relay closes having detected the ringing, the noise the chosen device generates will be constant. This can cause some confusion with different types of alarms e.g. fire alarms. If connecting a flashing light ensure that the device has its own integral relay to generate the flashing, (this is usually achieved by the device using a heat sensitive coil).

System Hardware Requirements

System hardware requirements are that a HHEU is installed in the telephone with a HESC-65 cable, and the customer supplied, specified device to be connected.

T001B Installation

Install the T001B unit in accordance with the following procedures (see Figure 8-25):

1. Install the HHEU and HESC-65 cable into the telephone.
2. Connect the other end of the HESC-65 cable into the T001B unit.
3. Connect the 12V power supply to the terminal strip inside the T001B relay unit, the positive lead to pin 3 and the negative lead to pin 1. Ensure that the power supply is set for 12V.
4. Connect the customer supplied bell, flashing lamp or electronic alarm to the terminal strip inside the T001B relay unit, the positive lead to pin 4 and negative lead to pin 2.
5. Plug the provided power cord into the power supply and to a 240VAC, 50Hz power source.

T001B Relay Unit Test

Test the T001B Relay Unit installation in acoordance with the following steps:

1. Make a call to the extension the unit is connected to.

   The bell or electronic alarm should continually ring, or if a flashing lamp is fitted, it should flash.

2. Ensure that when the telephone is answered and you cease ringing the extension the device stops ringing or flashing.
3. If the device does not ring or flash when the extension is called then using a suitable voltmeter check that the handset is providing 4.5 - 5V across pins 1 & 6 of HESC cable.

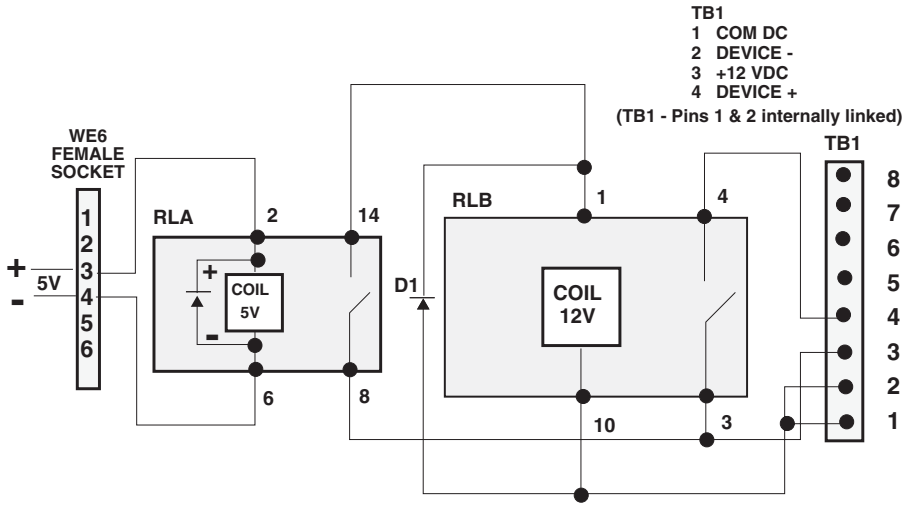


Figure 8-25 T001B Installation/Configuration

Power Failure Options

In the event of a power failure, Strata CTX uses these options:

Reserve Power

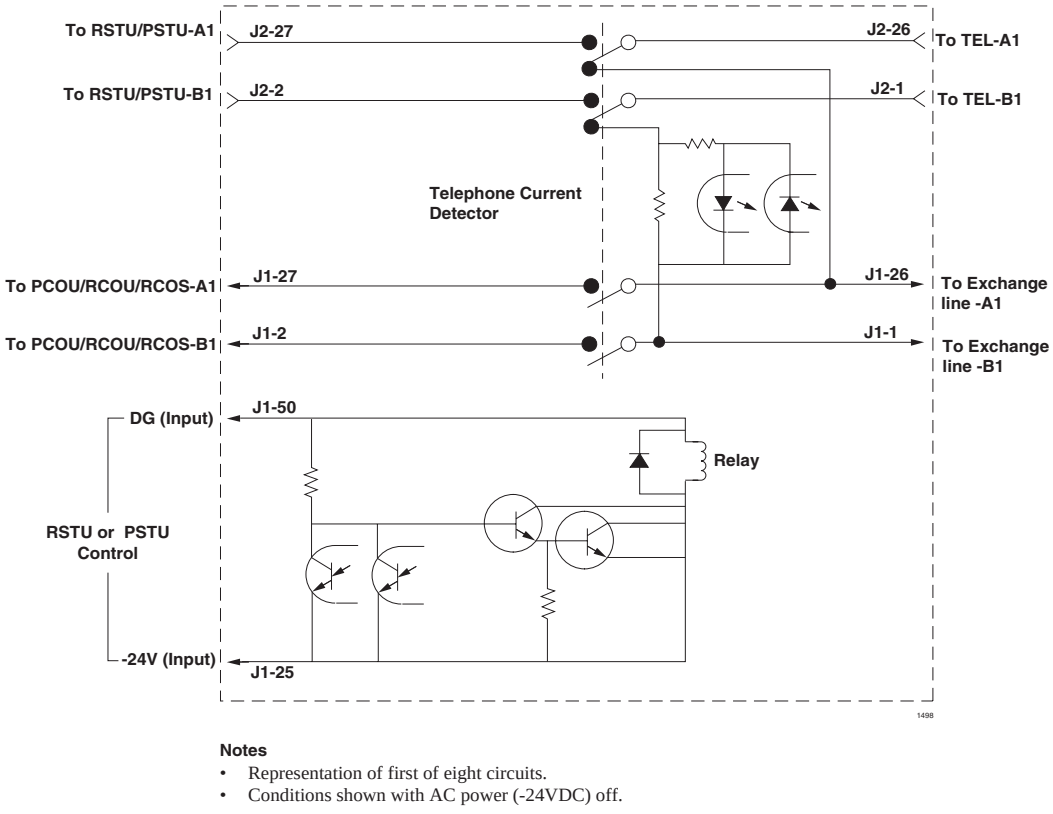
For information on the Reserve Power Option, see in Chapter 1, “CTX Primary AC and Reserve Power Considerations” on Page 1-31.

Power Failure Transfer Unit

An optional Power Failure Transfer Unit (DPFT) can be installed that automatically connects up to eight selected Exchange lines directly to designated standard telephones in the event of a power failure. The DPFT enables normal operation of the selected Exchange lines and standard telephones when the system is in service. When power is restored, each telephone is independently reconnected to system standard telephone circuit ports after it is finished with its direct Exchange line call. The DPFT is normally installed on the MDF.

Figure 8-26 provides a circuit diagram of the DPFT.

Note The DPFT option is only available with annlogue exchange lines.



Notes
- Representation of first of eight circuits.
- Conditions shown with AC power (-24VDC) off.

Figure 8-26 DPFT Circuit Diagram

Power Failure Emergency Transfer (DPFT) Installation

1. Mount the DPFT on or near the MDF.

Note See Chapter 6 – MDF PCB Wiring, DPFT/MDF interconnecting tables.

2. Using 25-pair cables with amphenol-type connectors (female for DPFT connector J1, male for DPFT connector J2), connect the DPFT to two 237 Krone strips.
3. Connect the Exchange lines selected for emergency use to the DPFT J1-block “PSTNA” and “PSTNA-B” terminals.
4. Connect the PCOU/RCOU/RCOS circuits related to the emergency Exchange lines to the DPFT J1-block “PCOU/RCOU/RCOS-A” and “PCOU/RCOU/RCOS-B” terminals.
5. Connect the standard telephone stations selected for emergency use to the DPFT J2-block “TEL-A” and “TEL-B” terminals.
6. Connect the RSTU or PSTU standard telephone circuits related to the emergency standard telephones to DPFT J2-block “PSTU-A” and “PSTU-B” terminals.
7. Connect the DPFT to the RSTU/PSTU DG and -24V terminals (See Chapter 6 – MDF PCB Wiring for RSTU/PSTU and PCOU/RCOU/RCOS wiring/interconnecting details). The -24V (Pin 25) and DG (Pin 50) ground terminals are available on the RSTU or PSTU only.

➤ **To test the operation of the DPFT**

1. Turn the system power switch Off.
2. Verify that Exchange dial tone is available at each standard telephone connected to the DPFT.
3. Call back to each telephone using an outside line.

Station Message Detail Recording (SMDR)

For each incoming, outgoing, tandem or conference call, the Strata CTX can generate a record that includes details of the call, including the originating station or trunk, the start time of the call, its duration, authorisation codes, etc. If a station user dials “999,” the Strata CTX also generates a record at the beginning of the call as part of its internal notification that an emergency call is in progress.

The BSIS optional PCB attaches to the ACTU of the CTX100 or the BECU of the CTX670 to provide four RS-232 interface jacks (one for SMDR and one for SMDI). See Figures 8-6 and 8-7, starting on page 8-6 for connection information.

SMDR Record Types

Distinct records are generated for different types of calls. The table below lists the record types. The type of each record is identified by a letter entry in the column of the record.

Table 8-1 Call Record Types

Record Type	Notes
B (aBandoned)	When a call is abandoned
N (Normal)	Simple outgoing or incoming call
S (Start)	Start of complex outgoing or incoming call
X (transfer)	When a call is transferred
E (End)	This record is associated with a specific S or X records, and indicates termination of a call
I (Initial)	When system is initialised
T (Time)	When the system time or date is changed
A (Authorisation)	When the input Account Code is verified and the result is successful, the Account Code is defined as the Authorisation Code.
C (Charge Account)	When an Account Code is entered
M (Charge Conference)	When an Account Code is entered during a conference call

The use of multiple records allows the CTX to account for multi-stage calls such as transfers and conferences. A simple outgoing or incoming call would generate a Normal record. A transferred call would generate a Start record for the first segment of the call and an End record for the second segment of the call. The appropriate times would be stored in each. A detailed description of SMDR is provided in a separate manual.

Several fields in the record may displayed or masked based on system programming. They include DISA security codes, authorisation codes, DDI and Caller ID.

The Strata CTX can buffer up to 1000 SMDR records in response to a loss of DTR signal from an attached call accounting device or external buffer. When the buffer overflows, subsequent call records will be lost until the buffer is cleared. The CTX buffer will be cleared by a system restart or loss of system power.

Table 8-2 SMDR Record Format

Line	Column	Name	Format	Notes
1	1(1)	Record Type	“N”/”S”/”X”/”E”/”B”/ ”I”/”T”/”A”/”C”/”M”	See “SMDR Record Types” on Page 8-29.
	2(1)	Space		
	3-5(3)	Record Number	XXX	Record Number (000 -- 127)
	6(1)	Space		
	7-12(6)	Node number	XX	00 - 99
	13(1)	Space		
	14-20(7)	Orig Information	“DN”+XXXXX “CF”+ XXXXX “T”+OLG+MMM “T”+ILG+MMM “A”+OLG+MMM “A”+ILG+MMM	Prime DN X=ID of conference “T”/”A”:Answersupervised/Unsupervised ILG: Incoming Line Group OLG: Outgoing Line Group MMM: Exchange number/Channel Group Number (Left positioned and padded space)
	21(1)	Space		
	22-28(7)	Term Information		
	29(1)	Space		
	30-43(14)	Time stamp	MO/DD HH:MM:SS	N/E Record: End of Call S Record:Start of Call If 911, time trunk is seized. X Record: Completion of transfer B Record: The call is abandoned I Record: System initialised T Record: Original/New system time A/C/M Record: Input account code MO = Month(01 -- 12) DD = Day (00 -- 31) HH = Hour (00 -- 23) MM = Minutes 00 -- 59) SS = Seconds (00 -- 59)
	44(1)	Space		
	45-54(10)	Call duration	HH:MM:SS.S	HH = Hour (00 -- 23) MM = Minutes (00 -- 59) SS = Seconds (00 -- 59) S = always 0
	55(1)	Space		
	56-87(32)	Dial information	XX….X	Dials/Account Codes (Left positioned and padded space)

Table 8-2 SMDR Record Format (Continued)

Line	Column	Name	Format	Notes
2	1(1)	Spaces		
	2(1)	New line	"&"	
	3-19(17)	Caller ID CESID	XXX…XXX "C"+ XXX…X	Caller ID CESID (Left positioned and padded spaces)
	20(1)	Spaces		
	21-24(4)	DISA	"DISA"	
	25(1)	Spaces		
	26-38(13)	ANI	XXXXX...XXXX	(00 -- 99) Area Code (000 -- 999) Exchange Code (000 -- 999) Extended Exchange code (0000 -- 9999)
	39(1)	Spaces		
	40-46(7)	DNIS	XXXXXXX	(0000000 -- 9999999)
	47(1)	Spaces		
	48-54(7)	AUXID 1	"DN"+XXXXX	XXXXX = Prime DN (Responsibility for outgoing)
	55(1)	Spaces		
	56-62(7)	AUXID 2	NN+XXXXX	NN = Node number (00 – 99) XXXXX = Prime DN

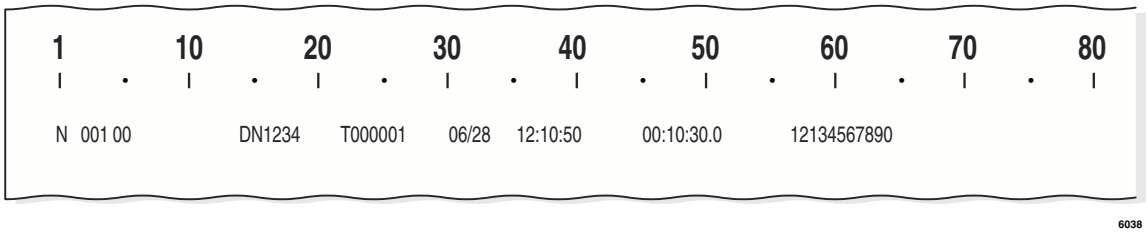


Figure 8-27 Sample Call Record – Simple Outing Call, Outside Party Answers

Table 8-3 Sample Call Record Explanation

Field	Notes
N	Normal incoming or outgoing call record.
001	Record number 1.
00	Used to identify the Node ID in a StrataNet network. Not used in a standalone system.
DN1234	Directory Number (DN) 1234 originated the call.
T000001	The call went out on Trunk Number 1.
06/28	Date
12:10:50	Time at which call was answered.
00:10:30:0	Duration of the call to the tenth of a second.
12134567890	The destination number dialled.
&	Start of a new line. More complex call records may use two lines.

Notes to Users

Step 1: Safety Approval

Toshiba Information System (U.K.) Ltd declare that the Strata CTX complies with the EEC's LVD directive, (Directive No. 73/23/EEC). The product has been assessed and found to comply with EN60950:2000.

The notes listed below form part of the products compliance with the aforementioned European Norm.

IMPORTANT SAFETY NOTES

1-1. Both systems must have an earth connection and must be hardwired to a main distribution point. The main cabinet must be earthed.

1-2. Table A-1 below identifies and classifies the ports available on the system:

Table A-1

Type of Circuit (EN60950 Classification)	Port Location	Port Description
SELV	Power Supply BPSU672F APSU112F	For connection of external 24 volt batteries.
SELV	Processor Boards: ACTU1F, BECU1F, BBCU1F	For connection of external Music-on-Hold source and Ethernet LAN connection
SELV	AETS1A	Ethernet I/F for CTX100 only
SELV	PDKU2A/BDKU/ BDKS/ADKU	For connection of Toshiba proprietary terminals.
SELV	BSIS1A	For connection of Voice Mail and Call Logging Equipment. RS232 ports.
TNV3	RSTU1F	For connection of approved 2 wire devices.
TNV3	RSTU3F/ASTU1F	For connection of approved 2 wire devices.
TNV3	PCOU2F/ PCOUS2F RCOU/RCOS/ RCOUS	For connection to PTO provided Loop Calling Unguarded Clear exchange lines.
TNV1	RBSU2A	2 Cct ISDN2, (TBR3), Basic Rate I/F. For connection to euro-ISDN services.
TNV1	RBSU1A	2 Cct ISDN2, (TBR3), Basic Rate I/F. For connection to euro-ISDN services.
TNV1	RBSS1A & RBSS2A	2 Cct ISDN2, Basic Rate I/F. For connection to euro-ISDN services.
TNV1	RPTU1F/RPTU2F	1ccts ISDN30, (TBR4), primary rate I/F. For connection to euro-ISDN services.

Table A-1 (Continued)

Type of Circuit (EN60950 Classification)	Port Location	Port Description
TNV2	PACU2F/PACU3F	4Cct AC15 Private Circuit I/F, (TBR17). For connection to PTO Private Circuit services.
TNV2	PEMU2F/REMU	4Cct AC15 Private Circuit I/F, (TBR17). For connection to PTO Private Circuit services.
SELV	BIOU1A	Contains various ports for connection of audio paging amplifiers, dry relay contacts to control external equipment.
SELV	BVPU1A	Voice Over IP interface cards. House Ethernet/RS232 ports.
SELV	Stratagy DK	Intergrated Voice Mail unit. House R232 ports.
SELV	RRCU1A	Optical interface board for connecting remote cabinets.
SELV	BPCI1A	USB port for connection of PC for CTI.
SELV	DKT2500/ DKT3000/DKT3500	Headset ports on any of the range of key telephones.

Any peripheral apparatus connected to the above ports must have the same EN60950 classification. ie.

- SELV ports must only be connected to SELV type ports.
- TNV ports must only be connected to TNV type ports.

1-3. The Strata CTX670 system must be hardwired into a switched fused spur, (which should comply with the requirements of a disconnecting device as specified in the standard EN60950), the switch on the fused spur outlet shall be considered the AC power disconnection device. This spur must be installed in accordance with 16th edition of the IEE wiring regulations, aka BS7671:1992. Or the latest edition of this standard.

The Strata CTX100 system must be hardwired into a switched fused spur, (which should comply with the requirements of a disconnecting device as specified in the standard EN60950), the switch on the fused spur outlet shall be considered the AC power disconnection device. This spur must be installed in accordance with 16th edition of the IEE wiring regulations, aka BS7671:1992. Or the latest edition of this standard

1-4. Environmental Installation details.

The Strata CT is designed to work within the following environmental conditions:

- Operating temperature 0oC to 40oC
- Humidity 20% to 80%

Step 2: EU Compliance

Toshiba Information Systems (U.K.) Ltd declare that the Strata CTX100 & CTX670 complies with the EEC's EMC directive, Directive No. 89/366/EEC as amended by directive 92/31/EEC. The product has been assessed and found to comply with the following generic standards:

- **EN55022:1998-9, EN/IEC61000-3-2/1995, EN/IEC61000-3-3/1995 (Emissions)**
- **EN52024:1998, EN61000-4-2/1995+A1:1998, EN61000-4-3/1997+A1:1998, EN61000-4-4/1995+A1:2001, EN61000-4-5/1995+A1:2001, EN61000-4-6/1995+A1:2001, (Immunity)**

The notes listed below form part of the products' compliance with the aforementioned European Norm.

To ensure EU compliance the system must installed in accordance with the instructions in the "Installation and Maintenance" manual. In order to maintain compliance any shielded cables supplied and/or ferrite suppression cores must be used.

Equipment details Strata CTX100

Base Cabinet Dimensions:	Expansion Cabinet Dimensions:
Height - 370mm	Height - 370mm
Width - 303mm	Width - 230mm
Depth - 259mm	Depth - 259mm
Weight - 8.8kg (fully equipped)	Weight - 6.9kg (fully equipped)

Equipment details Strata CTX670

Base Cabinet Dimensions:	Expansion Cabinet Dimensions:
Height - 296mm	Height - 254mm
Width - 672mm	Width - 672mm
Depth - 270mm	Depth - 270mm
Weight - 14.1kg (fully equipped)	Weight - 13.2kg (fully equipped)

Warning! ***This is a Class A product. In a domestic environment this Product may cause radio interference in which case the User may be required to take adequate measures***

Step 3: Type Approval

Toshiba Information Systems (UK), Ltd, (TIU), hereby declares that the Strata CTX product complies with the requirements of the EC Directive 1999/5/EC, (aka Radio & Telecommunications Terminal Equipment directive). A manufacture's Declaration under this Directive allows connection to the relevant Public Network Services and the right to place the Product on the market.

The Strata CT is classified as "Call Routing Apparatus" it is intended to be connected to the various Public Telecommunications Network Services for the purpose of generating and terminating "calls". Table A-2 below lists the intended purposes of all the system interfaces.

Table A-2

Interface Type	Network Service
PCOU2F/RCOU	Analogue Loop Calling Unguarded Lines. PD7002
RPTU1F/RPTU2F	Euro ISDN30 service. Approved to TBR 4 & TBR12.
RBSU1A & RBSU2A	Euro ISDN2 service. Approved to TBR 3.
PACU2F/PACU3F	Analogue 4 wire Private Circuits, uses AC15 signalling. Approved to TBR 17.
PEMU2F/REMU	Analogue 4 wire Private Circuits, uses DC5 signalling. Approved to TBR 17.
Note RPTU1F does not support QSig without the correct firmware.	

The system must be installed in accordance with BS6701 parts 1 and 2, the latest issue shall apply.

Toshiba Information Systems claim approval to OFTEL general variation NS/V/1235/P/100020. The information contained in this paragraph supports Toshiba's claim:

The following features require the interconnection of 2 or more exchange lines.

- **Multi-party conferencing**
- **Call Forward External***
- **Translation of Un-used Extension numbers***
- **DISA***

Warning!** ***These features can allow an Incoming callers access to an outgoing exchange line. There is an engineering programming parameter which can disable these features. In addition the DISA feature can be "password" protected. USERS SHOULD BE AWARE THAT THESE FEATURES CAN BE USED FOR FRAUDULENT PURPOSES. Please consult your supplier to ensure any necessary security measures are enabled.

Step 4: Network Planning Information

4-1. Strata CTX Tone Plan.

Table A-3 below lists the characteristics of the tones and signals used in Strata CTX.

Table A-3

Tones/ Signal to:	Frequency	Cadence	Meaning
Exchange Line	Music On Hold 1209Hz	N/A 0.12 ON 2s Off	Call on Hold Internaql Hold Tone
DKT	1. 500/640Hz	1s On 3s Off **OR** 1sOn 1s Off	I/C PSTN call Opt.1 & 2.
	2. 1240/1560Hz	1s On 3s Off **OR** 1sOn 1s Off	I/C PSTN call Opt.3 & 4.
	3. 840/1060Hz	1s On 3s Off **OR** 1sOn 1s Off	I/C PSTN call Opt.5 & 6.
	4. 860/1060Hz (T1) & 1240/ 1560Hz (T2)	T1-0.5s ON T2-0.5s On 3s Off **OR** T1-0.5s ON T2-0.5s On 3s Off	I/C PSTN call Opt.7. I/C PSTN call Opt.8.
	5. 2000Hz mod by 10Hz		I/C PSTN to Busy DKT
	5. 500Hz	1s On 3s Off	I/C Int call Opt 1
	6. 1300Hz	1s On 1 S Off	I/C Int call Opt 2
	7. 1000/800Hz	0.6s On 1000Hz/0.6s On 800Hz	Call from D/phone A
	8. 1000/800Hz	0.6s On 1000Hz/0.6s 800Hz	Call from D/phone B
	9. 660/500	0.7s On 660Hz/0.7s On 500Hz	Call from D/phone B
	10. 2000Hz	1s On 3s Off	Busy/DND Override
	11. 2000Hz 10Hz Intrpt	1s On 1 S Off	Recall Indication
	12. 860/1180Hz (T1) & 1300/1780Hz (T2)	T1-0.5s ON T2-0.5s On Repeat	Emergency Ring down Call
2 Wire extns	1. 20Hz	0.4s On 0.2s Off 0.4s On 3s Off	Ringing Signal Internal
	2. 20Hz	1s On 3s Off	Ringing Signal Internal
	3. DTMF A	80 or 160mS	Voice Mail Answer
	4. DTMF D	80 or 160mS	Voice Mail Disconnect
	5. DTMF B	80 or 160mS	Voice Mail Recall
	6. MWI Signal	0.9 ON/0.1s Off	Message Waiting Signal
	7. 20Hz	1s On 1 S Off	Recall Ringing Signal
	8. 1209Hz	2 bursts 0.16s On twice then 3s Off	External Call waiting
	9. 1209Hz	2 bursts 0.5s On twice then 3s Off	Internal Call waiting

Table A-3 (Continued)

Tones/ Signal to:	Frequency	Cadence	Meaning
Internal general	1. 350/440Hz	Continuous	Dial Tone
	2. 400(T1), 350/440Hz(T2)	4 bursts of 0.125s T2-3s On	DND Stutter Dial Tone
	3. 350/440Hz	5 bursts of 0.1s 3s On	MW Stutter Dial Tone
	4. 400/450Hz	0.4s On, 0.2s Off 0.4s On 2s Off	Ringing Back Tone
	5. 400Hz	0.375s On/0.375s Off Repeated	Normal Extension Busy
	6. 400Hz	0.375s On/0.375s Off Repeated	Busy-Extension in DND
	7. 400Hz	0.375s On/0.375s Off Repeated	NU/Reorder Tone
	8. 440Hz	1s On	Executive override
	9. 350/440Hz	3 bursts of 0.1s	Entry Tone
	10. 1209Hz(T1), 500Hz(T2)	T1-3 bursts of 0.25s, T2 0.25s three timess	Operation rejected. In call
	11. 350/440Hz	3 bursts of 0.125s	Operation accepted In call
	12. 2000Hz	2 bursts of 0.125s	Progmg Operation accepted
	13. 2000Hz	0.75s On	Prgmg Operation rejected
	14. 350/440Hz	1s On 2s Off Repeated	CFD stutter dial tone

4-2. System Port to Port losses.

Table A-4 below lists the various “typical” transmission gains/losses when inter-connecting the various port types.

Table A-4

System Port Type	RCOU3R/ PCOU2F		RBSU2A		RPTU1F/ RPTU2F		PEMU2F/ REMU		PACU2F/ PACU3F		RSTU3F ASTU	
	to	fm	to	fm	to	fm	to	fm	to	fm	to	fm
PCOU2F/RCOU	3.7	3.7	1.8	1.9	1.8	1.9	3.1	3.2	-0.7	-1.5		
RPTU1F/2F	1.9	1.8	0	0	0	0						
RBSU2A	1.9	1.8	0	0	0	0						
PEMU2F/REMU	3.1	3.2	1.3	1.3	1.3	1.3	2.6	2.6	-2.0	-2.0		
PACU2F/PACU3F	-0.7	-1.5	-3.4	-2.5	-3.4	-2.5	-2.0	-2.0	-6.0	-6.0		
RSTU3F/ASTU	-0.5	-1.0	-2.4	-2.8	-2.4	-2.8	-1.1	-1.5	-5.9	-6.2	-5.2	-5.2

-Values indicate a transmission loss.

4-3. Loudness Rating.

The table below lists the measured loudness rating of the Toshiba proprietary terminals.

SLR and RLR @ 0km PSTN. (All values are +/-dB)

Table A-5

System Port Type	PDKU2A/BDKU/BDKS ITS-A	
	SLR	RLR
PCOU2F/RCOU3F	1dB	-5dB to -16dB
RPTU1F/RPTU2F/RBSU1A	6dB	2dB to -10dB
PEMU2F/REMU	4dB	-2dB to -14dB
PACU2F/PACU3F	8dB	0dB to -9dB

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